T500 and W500 Setup Poster
P/N 44C4187
04/30/2008

Size : 11x14 inches
Color : 2 color job = Process Black (This plate must be printed in PMS Process Black C)
Process Magenta (This plate must be printed in PMS 032cvc)
Font : IBM Fonts and Helvetica Neue Family
Material : 105 gsm gloss art paper
Blue line shows die-cut. DO NOT PRINT.
Please change the barcode No.
Please change the country name if the poster is printed in other than China.

ThinkPad®

Unpack

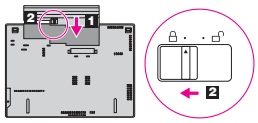
- ☐ ThinkPad® notebook
- ☐ Battery pack
- ☐ Power cord
- ☐ AC adapter
- ☐ 2 TrackPoint® caps
- ☐ Manuals
  - Setup Instructions (this sheet)
  - Safety and Warranty Guide
  - Service and Troubleshooting Guide
  - Other supplements or flyers

See reverse for notes about unlisted, missing, or damaged items and a recovery disc.

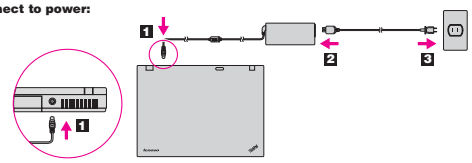
Initial Setup Instructions

Read the safety notices and important tips in the included manuals before using your computer.

1 Install battery pack:
Your battery is ready to use.



2 Connect to power:



3 Turn on the power: 9

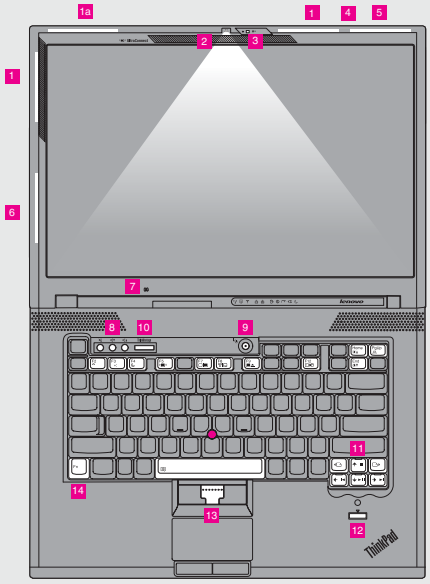
4 Point and click with UltraNav® Multi-pointing Navigation System:
Press the TrackPoint cap or move across the touch pad in the direction you want to move the pointer. The left and right buttons below the space bar and touch pad function like mouse buttons.

5 Configure the Operating System following on-screen instructions:
This process takes several minutes.

6 For more detailed information, press the ThinkVantage® button: 10

ThinkVantage Design

1. **UltraConnect™ wireless LAN and WiMAX combo antennas (main and auxiliary)**
1a. **UltraConnect wireless LAN antenna (third)***
2. **ThinkLight® keyboard light**
3. **Integrated camera***
4. **One - handed latch**
5. **UltraConnect wireless USB antenna***
6. **UltraConnect wireless WAN antenna***
7. **Built-in microphone**
8. **Volume and mute buttons**
9. **Power button**
10. **ThinkVantage button**
11. **Web browser back and forward**
12. **Fingerprint reader***
13. **TrackPoint center button**
14. **Fn key**



Use in combination with other keys to access special ThinkPad features.

Fn +
- F2 Lock your computer
- F3 Manage battery & power
- F4 Enter sleep (standby)
- F5 Manage wireless connections
- F7 Change display settings
- F8 Change input device settings
- F9 Manage external devices

Fn +
- F12 Enter hibernation
- PgUp ThinkLight on/off
- Multimedia controls
- Home End Change display brightness
- Magnify screen contents

*Select models only.

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Font : IBM Fonts and Helvetica Neue Family
Material : 105 gsm gloss art paper
Blue line shows die-cut. DO NOT PRINT.
Please change the barcode No.
Please change the country name if the poster is printed in other than China.

Thank you for choosing a ThinkPad notebook.

The ThinkPad notebook is loaded with advanced features.

Reliability and security

Increased durability

The ThinkPad roll cage and the top cover roll cage, made of light, strong magnesium alloy, protect critical system components from the shock of a drop. Your computer is equipped with a shock-mounted hard drive to prevent a hard disk failure due to external shock.

Advanced security

The integrated fingerprint reader*, the full disk encryption hard drive*, and an embedded security chip called the Trusted Platform Module, keep your computer safe from external threats.

To learn more about how to protect your computer, see Security in Access Help.

Energy-saving design

The energy-efficient design of your computer enables longer continuous operation without a connection to an electrical outlet. Energy-saving features such as sophisticated power management give you the best balance between performance and power saving. Your computer meets the ENERGY STAR® 4.0 standard and the Climate Savers® efficiency standards.

To learn more about extending battery life, see Learn how to achieve all day computing in Access Help.

Diverse connectivity options

Your computer provides you with advanced connectivity options, such as high-speed Gigabit Ethernet, Wireless LAN, WiMAX*, Wireless USB*, Bluetooth®*, and Wireless WAN*.

To learn more about network connections, see Getting connected in Access Help.

*Select models only.

ThinkVantage Technologies

ThinkVantage Technologies are advanced technologies that enable you to improve productivity, protect your data, and reduce overall lifecycle costs.

To learn more about ThinkVantage Technologies, open the ThinkVantage Productivity Center by pressing the ThinkVantage button.

Using Access Help (online manual) and the included manuals

To find detailed information about your computer, open Access Help, or see the Safety and Warranty Guide or the Service and Troubleshooting Guide.

Access Help

Access Help is a comprehensive online manual that provides answers to most of your questions about your computer, helps you to configure preinstalled features and tools, or solve problems.

To open Access Help, do either of the following:

- Press the ThinkVantage button. Under Quick Links in the ThinkVantage Productivity Center, click "Access on-system help."
- Click Start, move the pointer to All Programs; then to ThinkVantage. Click Access Help.

Safety and Warranty Guide

-Important safety information
-Operating environment and other important notices
-Warranty information

Service and Troubleshooting Guide

-Introduction to other sources of information
-Important tips for taking care of your computer
-Diagnostics and troubleshooting
-Recovery options
-Help and service
-Warranty information for your computer

* Additional unpacking notes:
1) Some models may contain items that are not listed.
2) If any item is missing or damaged, please contact your place of purchase.
3) Everything for recovering factory-installed files and applications is on your hard disk eliminating the need for a recovery disc. For more information, see "Recovery options" in the Service and Troubleshooting Guide.

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ThinkPad

ThinkPad® T500 and W500 Service and Troubleshooting Guide

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ThinkPad

ThinkPad® T500 and W500 Service and Troubleshooting Guide

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Note

Before using this information and the product it supports, be sure to read the following:

- *Safety and Warranty Guide* included in the package with this publication.
- Wireless related information in online *Access Help* and Appendix D, "Notices," on page 73.
- *Regulatory Notice* included in the package with this publication.

The Safety and Warranty Guide and the Regulatory Notice have been uploaded on the Web site. To refer to them, go to http://www.lenovo.com/think/support, click Troubleshooting, and then click User's guides and manuals.

Second Edition (June 2008)

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Contents

Read this first v

Chapter 1. Finding information 1
This guide and other publications 1
Finding information with the ThinkVantage button 2
Additional information for *Access Help* . . . 3

Chapter 2. Taking care of your ThinkPad computer 5
Important tips. 5
Be careful about where and how you work 5
Be gentle with your computer 6
Register your computer 6
Carry your computer properly 6
Connect the internal modem correctly. . . 6
Handle storage media and drives properly 6
Be sure not to modify your computer . . . 7
Take care in setting passwords 7
Care for the fingerprint reader 7
Cleaning the cover of your computer . . . 8
Cleaning your computer keyboard 8
Cleaning your computer display 8

Chapter 3. Solving computer problems . . 11
Frequently asked questions 11
Entering the BIOS Setup Utility 12
Diagnosing problems 13
HDD diagnostic program 13
Diagnosing problems using PC-Doctor from the service partition 14
Troubleshooting. 15
Error messages 15
Errors without messages 21
Memory problems 23
Password problems 23
Keyboard problems 24
Pointing device problems 24
Sleep (standby) or hibernation problems 25
Computer screen problems 27
Battery problems 30
AC adapter problems 30
Hard disk drive (HDD) or solid state drive (SSD) problems 31
Fingerprint reader problems 33
Startup problems 33

Chapter 4. Recovery options 35
Introducing Rescue and Recovery 35
Solid state drive (SSD) 35
Restoring the factory contents 36
Recovering data. 37

Chapter 5. Upgrading and replacing devices 39
Replacing the battery 39
Upgrading the hard disk drive or solid state drive 41
Replacing memory 48

Chapter 6. Getting help and service . . . 55
Getting help and service 55
Getting help on the Web 55
Calling the Customer Support Center . . . 55
Getting help around the world 57
Worldwide telephone list. 57

Appendix A. Warranty information 63
Types of warranty service 64

Appendix B. Customer Replaceable Units (CRUs) 67

Appendix C. Features and Specifications 69
Features 69
Specifications 70

Appendix D. Notices. 73
Notices. 73
Export classification notice 74
Electronic emissions notices 74
Federal Communications Commission (FCC) Statement 74
Industry Canada Class B emission compliance statement 75
Avis de conformité à la réglementation d'Industrie Canada. 75
European Union EMC Directive conformance statement 75

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EU-EMC Directive (2004/108/EC) EN 55022 class B Statement of Compliance . . 76
Japanese VCCI Class B statement 77
EU WEEE Statements 77
Notice for users in the U.S.A. 77
ENERGY STAR model information 78
Notice for Regulatory information 80

Trademarks 81

Index 83

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Read this first

Be sure to follow the important tips given here to continue to get the most use and enjoyment out of your computer. Failure to do so might lead to discomfort or injury, or cause your computer to fail.

Protect yourself from the heat that your computer generates.

When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become *hot*. The temperature they reach depends on the amount of system activity and the level of charge in the battery.

Extended contact with your body, even through clothing, could cause discomfort or even a skin burn.

- *Avoid* keeping your hands, your lap, or any other part of your body in contact with a hot section of the computer for any extended time.
- Periodically *take breaks* from using the keyboard by lifting your hands from the palm rest.

Protect yourself from the heat generated by the AC adapter.

When the AC adapter is connected to an electrical outlet and your computer, it generates heat.

Extended contact with your body, even through clothing, may cause a skin burn.

- *Do not* place the AC adapter in contact with any part of your body while it is in use.
- *Never* use it to warm your body.

Prevent your computer from getting wet.

To avoid spills and the danger of electrical shock, keep liquids away from your computer.

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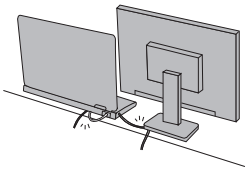
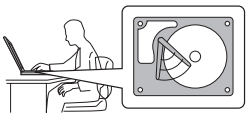
Protect the cables from being damaged.



Applying strong force to cables may damage or break them.

Route communication lines, or the cables of an AC adapter, a mouse, a keyboard, a printer, or any other electronic device, so that they cannot be walked on, tripped over, pinched by your computer or other objects, or in any way subjected to treatment that could interfere with the operation of your computer.

Protect your computer and data when moving it.



Before moving a computer equipped with a hard disk drive, do one of the following, and make sure that the power-on indicator is off:

– Turn it off.

– Press Fn+F4 to put it in sleep (standby) mode.

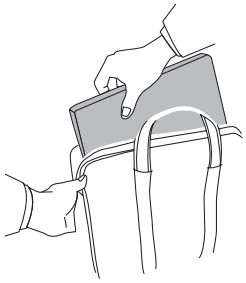
– Press Fn+F12 to put it in hibernation mode.

This will help to prevent damage to the computer, and possible loss of data.

Handle your computer gently.

Do not drop, bump, scratch, twist, hit, vibrate, push, or place heavy objects on your computer, display, or external devices.

Carry your computer carefully.



- Use a quality carrying case that provides adequate cushioning and protection.
- *Do not* pack your computer in a tightly packed suitcase or bag.

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Chapter 1. Finding information

This guide and other publications

Setup Instructions

helps you to unpack your ThinkPad® computer and get started. It includes a few tips for first-time users.

This *Service and Troubleshooting Guide*

provides information about caring for your ThinkPad computer, basic troubleshooting information, some recovery procedures, help and service information, and warranty information for your computer. The troubleshooting information in this Guide applies only to problems that might prevent you from accessing the comprehensive online manual, called Access Help, preinstalled on your ThinkPad computer.

Access Help

is a comprehensive online manual that provides answers to most of your questions about your computer, helps you to configure preloaded features and tools, or solve problems. To open Access Help, do either of the following:

- Press the ThinkVantage® button. Under Quick Links in the Productivity Center (or Lenovo Care℠), click **Access on-system help**.
- Click **Start**, move the pointer to **All Programs**; then to **ThinkVantage**. Click **Access Help**.

Safety and Warranty Guide

includes general safety instructions and complete Lenovo™ Limited Warranty.

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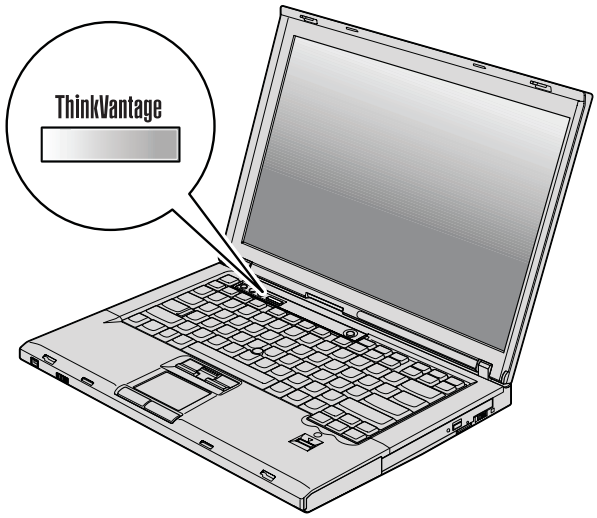
supplements this Guide. Read it before you use the wireless features of your ThinkPad computer. The ThinkPad computer complies with the radio frequency and safety standards of any country or region in which it has been approved for wireless use. You are requested to install and use your ThinkPad computer in strict accordance with the local RF regulations.

Finding information with the ThinkVantage button



The blue ThinkVantage button can help you in many situations when your computer is working normally, and even when it is not. Press the ThinkVantage button to open the ThinkVantage Productivity Center (or Lenovo Care) and get access to informative illustrations and easy-to-follow instructions for getting started and staying productive.

You can also use the ThinkVantage button to interrupt the startup sequence of your computer and start the Rescue and Recovery™ workspace, which runs independently of the Windows® operating system and is hidden from it.

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Additional information for *Access Help*

Password Reset Service

Although *Access Help* describes the Password Reset Service, that service cannot be used on your computer. Note your passwords and keep them in a safe place. If you forget your passwords, you must take your computer to a Lenovo reseller or a marketing representative.

Disabling the integrated fingerprint reader

Add the following items to the tables for I/O Port Access in the Security menu of the BIOS Setup Utility. You can find the tables in "BIOS Setup Utility items" in *Access Help*.

Function	Selection (Default value is in boldface.)	Comments
Fingerprint reader	• **Enabled** • Disabled	If you select "Disabled," the integrated fingerprint reader is disabled and you cannot use it.

By default, the integrated fingerprint reader is enabled. To disable it, do as follows:

1. Save all open files, and exit all applications.
2. Turn your computer off and then on again.
3. When the logo screen is displayed, press the F1 key. The BIOS Setup Utility opens.
4. Using the cursor keys, move to **Security**, and press Enter. The Security menu opens.
5. Using the cursor keys, move to **I/O Port Access**, and press Enter. The I/O Port Access submenu opens.
6. Using the cursor keys, move to **Fingerprint Reader**, and press Enter.
7. Select **Disabled**.
8. Press F10 to exit.
9. In the Setup Confirmation window, select **Yes**.

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Chapter 2. Taking care of your ThinkPad computer

Though your computer is designed to function reliably in normal work environments, you need to use common sense in handling it. By following these important tips, you will get the most use and enjoyment out of your computer.

For the most important instructions for using your computer, see "Read this first" on page v.

Important tips

Be careful about where and how you work

- Store packing materials safely out of the reach of children to prevent the risk of suffocation from plastic bags.
- Keep your computer away from magnets, activated cellular phones, electrical appliances, or speakers (within 13 cm or 5″).
- Avoid subjecting your computer to extreme temperatures (below 5°C/41°F or above 35°C/95°F).
- Some appliances, such as certain portable desktop fans or air purifiers, can produce negative ions. If a computer is close to such an appliance, and is exposed for an extended time to air containing negative ions, it may become electrostatically charged. Such a charge may be discharged through your hands when you touch the keyboard or other parts of the computer, or through connectors on I/O devices connected to it. Even though this kind of electrostatic discharge (ESD) is the opposite of a discharge from your body or clothing to the computer, it poses the same risk of a computer malfunction.

  Your computer is designed and manufactured to minimize any effects of electrostatic charge. An electrostatic charge above a certain limit, however, can increase the risk of ESD. Therefore, when using the computer close to an appliance that can produce negative ions, give special attention to the following:

  – Avoid directly exposing your computer to the air from an appliance that can produce negative ions.
  – Keep your computer and peripherals as far as possible from such an appliance.
  – Wherever possible, ground your computer to facilitate safe electrostatic discharge.

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Note: Not all such appliances cause a significant electrostatic charge.

Be gentle with your computer

- Avoid placing any objects (including paper) between the display and the keyboard or the palm rest.
- Your computer display is designed to be opened and used at an angle slightly greater than 90 degrees. Do not open the display beyond 180 degrees, as this might damage the computer hinge.
- Do not turn your computer over while the AC adapter is plugged in. This could break the adapter plug.

Register your computer

- Register your ThinkPad products with Lenovo (visit the following Web site: http://www.lenovo.com/register). This can help authorities return your computer to you if it is lost or stolen. Registering your computer also enables Lenovo to notify you about possible technical information and upgrades.

Carry your computer properly

- Before moving your computer, be sure to remove any media, turn off attached devices, and disconnect cords and cables.
- When picking up your open computer, hold it by the bottom. Do not pick up or hold your computer by the display.

Connect the internal modem correctly

- Your computer modem might use only an analog telephone network, or public-switched telephone network (PSTN). Do not connect the modem to a PBX (private branch exchange) or any other digital telephone extension line because this could damage your modem. Analog phone lines are often used in homes, while digital phone lines are often used in hotels or office buildings. If you are not sure which kind of phone line you are using, contact your telephone company.
- Your computer might have both an Ethernet connector and a modem connector. If so, be sure to connect your communication cable to the correct one, so your connector is not damaged.

Handle storage media and drives properly

- If your computer comes with an optical drive, do not touch the surface of a disc or the lens on the tray.
- Wait until you hear the CD or DVD click into the center pivot of an optical drive before closing the tray.
- On your ThinkPad computer, use only optical drives designed for use with the Serial Ultrabay™ Slim or the Serial Ultrabay Enhanced™.

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- The optical drives installed on your computer cannot be used with the ThinkPad Advanced Dock. You can use only the optical drives designed for the Ultrabay Enhanced of the ThinkPad Advanced Dock.
- When installing the HDD, SSD, or optical drive, follow the instructions shipped with your hardware, and apply pressure only where needed on the device.
- Turn off your computer if you are replacing the HDD or SSD.
- When replacing the primary HDD or SSD, reattach the cover of the drive slot.
- Store your external and removable hard disk or optical drives in the appropriate containers or packaging when they are not being used.
- Before you install any of the following devices, touch a metal table or a grounded metal object. This action reduces any static electricity from your body. The static electricity could damage the device.
  - Memory module
  - PCI Express Mini Card
  - PC Card
  - ExpressCard
  - Smart Card
  - Memory Card, such as xD-Picture Card, SD Card, Memory Stick, and MultiMediaCard
  - Communication Daughter Card

Note: When transferring data to or from a Flash Media Card, such as an SD card, do not put your computer in sleep (standby) or hibernation mode before the data transfer is complete. To do so might cause damage to your data.

Note: The SDHC card cannot be used on the ThinkPad Advanced Dock.

Be sure not to modify your computer

- Only an authorized ThinkPad repair technician should disassemble and repair your computer.
- Do not modify or tape the latches to keep the display open or closed.

Take care in setting passwords

- Remember your passwords. If you forget a supervisor or hard disk password, Lenovo authorized service provider cannot reset it, and you will have to replace your system board, or HDD or SSD.

Care for the fingerprint reader

The following actions could damage the fingerprint reader or cause it not to work properly:

- Scratching the surface of the reader with a hard, pointed object.
- Scraping the surface of the reader with your nail or anything hard.

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- Using or touching the reader with a dirty finger.

If you notice any of the following conditions, gently clean the surface of the reader with a dry, soft, lint-free cloth:

- The surface of the reader is dirty or stained.
- The surface of the reader is wet.
- The reader often fails to enroll or authenticate your fingerprint.

Cleaning the cover of your computer

Occasionally clean your computer as follows:

1. Prepare a mixture of a gentle kitchen-use detergent (one that does not contain abrasive powder or strong chemicals such as acid or alkaline). Use 5 parts water to 1 part detergent.
2. Absorb the diluted detergent into a sponge.
3. Squeeze excess liquid from the sponge.
4. Wipe the cover with the sponge, using a circular motion and taking care not to let any excess liquid drip.
5. Wipe the surface to remove the detergent.
6. Rinse the sponge with clean running water.
7. Wipe the cover with the clean sponge.
8. Wipe the surface again with a dry, soft lint-free cloth.
9. Wait for the surface to dry completely and remove any cloth fibers from the computer surface.

Cleaning your computer keyboard

1. Absorb some isopropyl rubbing alcohol on a soft, dust-free cloth.
2. Wipe each keytop surface with the cloth. Wipe the keys one by one; if you wipe several keys at a time, the cloth may hook onto an adjacent key and possibly damage it. Make sure that no liquid drips onto or between the keys.
3. Allow to dry.
4. To remove any crumbs and dust from beneath the keys, you can use a camera blower with a brush or cool air from a hair drier.

Note: Avoid spraying cleaner directly on the display or the keyboard.

Cleaning your computer display

1. Gently wipe the display with a dry, soft lint-free cloth. If you see a scratch-like mark on your display, it might be a stain transferred from the keyboard or the TrackPoint® pointing stick when the cover was pressed from the outside.
2. Wipe or dust the stain gently with a soft, dry cloth.

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3. If the stain remains, moisten a soft, lint-free cloth with water or a 50-50 mixture of isopropyl alcohol and water that does not contain impurities.
4. Wring out as much of the liquid as you can.
5. Wipe the display again; do not let any liquid drip into the computer.
6. Be sure to dry the display before closing it.

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Chapter 3. Solving computer problems

Note: See *Access Help* if your system is running and Access Help is accessible. This chapter presents information for use when Access Help is inaccessible.

Frequently asked questions

This section lists frequently asked questions and tells where you can find detailed answers. For details about each publication included in the package with the ThinkPad computer, see "This guide and other publications" on page 1.

What safety precautions should I follow when using my ThinkPad computer?

See the separate *Safety and Warranty Guide* for detailed information about safety.

How can I prevent problems with my ThinkPad computer?

See "Read this first" on page v, and also Chapter 2, "Taking care of your ThinkPad computer," on page 5 of this Guide. More tips can be found in the following sections of *Access Help*:

- Preventing problems
- Troubleshooting

What are the main hardware features of my new ThinkPad computer?

See "About your computer" in *Access Help*.

Where can I find the detailed specifications for my ThinkPad computer?

See http://www.lenovo.com/think/support.

I need to upgrade a device ***or*** **I need to replace one of the following: the HDD, the SSD, the PCI Express Mini Card, the Modem Daughter Card, the memory, the keyboard, or the palm rest.**

See the Appendix B, "Customer Replaceable Units (CRUs)," on page 67 of this Guide for the list of Customer Replaceable Units and the location of the instructions for removing or replacing components.

My computer is not operating properly.

See "Problem solving" in *Access Help*. This guide describes methods of troubleshooting for use when online Access Help is inaccessible.

Where are the recovery discs?

Your computer may have come with or without a recovery disc or Windows disc depending on your model. For an explanation of the alternative recovery methods offered by Lenovo, see "Restoring the factory contents" on page 36 of this Guide.

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How can I contact the Customer Support Center?

See Chapter 6, "Getting help and service," on page 55 of this Guide. For the phone numbers of the Customer Support Center nearest to you, see "Worldwide telephone list" on page 57.

Where can I find warranty information?

See the separate *Safety and Warranty Guide* for detailed warranty information. For the warranty applicable to your computer, including the warranty period and type of warranty service, see Appendix A, "Warranty information," on page 63.

Entering the BIOS Setup Utility

Your computer provides a program, called BIOS Setup Utility, that enables you to select various setup parameters.

- Config: Set the configuration of your computer.
- Date/Time: Set the date and time.
- Security: Set security features.
- Startup: Set the startup device.
- Restart: Restart the system.
- HDD diagnostic program: Run the diagnostic test of the HDD or SSD.

To enter the BIOS Setup Utility, do as follows:

1. To protect yourself against accidental loss of data, back up your data and computer registry. For details, see "Basics" in *Access Help*.
2. Turn off the computer, and then turn it on again.
3. When the ThinkPad logo comes up, immediately press F1 to enter the BIOS Setup Utility.

   If you have set a supervisor password, the BIOS Setup Utility menu appears after you enter the password. You can start the utility by pressing Enter instead of entering the supervisor password; however, you cannot change the parameters that are protected by the supervisor password. For more information, see the on-board help.
4. Using the cursor keys, move to an item you want to change. When the item you want is highlighted, press Enter. A submenu is displayed.
5. Change the items you wish to change. To change the value of an item, use the F5 or F6 key. If the item has a submenu, you can display it by pressing Enter.
6. Press F3 or Esc to exit from the submenu. If you are in a nested submenu, press Esc repeatedly until you reach the **BIOS Setup Utility** menu.

   Note: If you need to restore the settings to their original state as of the time of purchase, press F9 key to load the default settings. You can also select an option in the Restart submenu to load the default settings or discard the changes.

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7. Select **Restart**; then press Enter. Move the cursor to the option you want for restarting your computer; then press Enter. Your computer restarts.

Diagnosing problems

If you have a problem with your computer, you can test it by using PC-Doctor® for Windows.

To run PC-Doctor for Windows, do as follows:

1. Click **Start**.
2. Move the pointer to **All Programs** and then to **PC-Doctor for Windows**.
3. Click **PC-Doctor for Windows**.

For more information about PC-Doctor for Windows, see the Help for the program.

Attention:

- If you need help or further information about the problem, choose any of the following:
  - Lenovo Troubleshooting Center
  - Update System Drivers
  - System Information
- Running any tests may take up to several minutes or longer. Make sure you have time to run the entire test; do not interrupt the test while it is running.

When preparing to contact the Customer Support Center, be sure to print the test log so that you can rapidly provide information to the help technician.

HDD diagnostic program

If your hard disk drive (HDD) or solid state drive (SSD) is not operating properly, you may be able to find the problem by running the HDD diagnostic program in the BIOS Setup Utility.

To run the diagnostic program, do as follows:

1. Turn off the computer, and then turn it on again.
2. When the ThinkPad logo comes up, immediately press F1 to enter the BIOS Setup Utility.
3. Using cursor keys, select **HDD diagnostic program** and press Enter. The menu for the HDD diagnostic program opens.

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4. Using cursor keys, select **Main hard disk drive** or **Ultrabay hard disk drive**. Press Enter to start the diagnostic program. The diagnostic program runs a read verification test and a speed test of the drive you select, and reports its findings.

   Note: If you dock your computer in the ThinkPad Advanced Dock, the diagnostic program cannot test the HDD or SSD that is installed in the Ultrabay Enhanced of the ThinkPad Advanced Dock.

5. If the diagnostic program returns any error messages, call the Customer Support Center for service. The diagnostic program may return one or both of the following error messages:

   For the main storage drive:

   - Error code 0000: Read verification failed
   - Error code 0100: Speed test failed
   - Error code 0200: Controller Diag failed

   For the Ultrabay storage drive:

   - Error code 0002: Read verification failed
   - Error code 0102: Speed test failed
   - Error code 0202: Controller Diag failed

6. If the diagnostic program returns no error message but you still have some concerns:

   - See the instructions in the "Introducing Rescue and Recovery" section in online *Access Help*, and run the program for a diagnostic test of the HDD or SSD.
   - Download PC-Doctor for DOS for your computer from the following Web site: http://www.lenovo.com/support/site.wss/document.do?sitestyle=lenovo&lndocid=tpad-matrix.

Diagnosing problems using PC-Doctor from the service partition

By using PC-Doctor from the Rescue and Recovery workspace in the service partition of the hard disk drive, you can diagnose your system without starting up the operating system.

To run PC-Doctor, do as follows:

1. Turn off the computer, and then turn it on again.
2. When the ThinkPad logo comes up, immediately press the ThinkVantage button. The Rescue and Recovery workspace opens.
3. Click **Diagnose hardware**.

For more information about PC-Doctor, see the Help for the program.

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Troubleshooting

If you do not find your problem here, see *Access Help*. The following section only describes problems that might prevent you from accessing this help system.

Error messages

Note:

1. In the charts, x can be any character.
2. The version of PC-Doctor referred to here is PC-Doctor for Windows.

Message	Solution
0176: System Security - The System has been tampered with.	This message is displayed if you remove the Security Chip and reinstall it, or install a new one. To clear the error, enter the BIOS Setup Utility. If this does not solve the problem, have the computer serviced.
0182: Bad CRC2. Enter BIOS Setup and load Setup defaults.	Checksum of the CRC2 setting in the EEPROM is not correct. Press F1 to enter the BIOS Setup Utility. Press F9 and then Enter to load the default setting. Press F10 and then Enter to restart the system.
0185: Bad startup sequence settings. Enter BIOS Setup and load Setup defaults.	Checksum of the startup sequence setting in the EEPROM is not correct. Press F1 to enter the BIOS Setup Utility. Press F9 and then Enter to load the default setting. Press F10 and then Enter to restart the system.
0190: Critical low-battery error	The computer turned off because the battery is low. Connect the AC adapter to the computer and charge the battery, or replace the battery with a fully charged one.
0191: System Security - Invalid remote change requested.	The system configuration change has failed. Confirm the operation and try again. To clear the error, enter the BIOS Setup Utility.
0199: System Security - Security password retry count exceeded.	This message is displayed if you enter a wrong supervisor password more than three times. Confirm the supervisor password and try again. To clear the error, enter the BIOS Setup Utility.
01C8: More than one modem devices are found. Remove one of them. Press <Esc> to continue.	Remove one of the Modem Daughter Cards. Otherwise, press Esc to ignore the warning message. If this does not solve the problem, have the computer serviced.

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Message	Solution
01C9: More than one Ethernet devices are found. Remove one of them. Press <Esc> to continue.	Your ThinkPad computer has a built-in Ethernet feature, and you cannot add another such feature by installing an Ethernet device such as a Mini-PCI Ethernet Card or an Ethernet Daughter Card. If this error message is displayed, remove the Ethernet device that you installed. Otherwise press Esc to ignore the warning message. If this does not solve the problem, have the computer serviced.
0200: Hard disk error	The HDD or SSD is not working. Make sure that the HDD or SSD is attached firmly. Run the BIOS Setup Utility; then make sure the drive is not disabled in the Startup menu.
021*x:* Keyboard error	Make sure that there are no objects placed on the keyboard, or if you have one, the external keyboard. Turn off the computer, and turn off all attached devices. Turn on the computer first; then turn on the attached devices. If you still see the same error code, do the following: If an external keyboard is connected, do the following: • Turn off the computer and disconnect the external keyboard; then turn on the computer. Make sure that the built-in keyboard operates correctly. If it does, have the external keyboard serviced. • Make sure that the external keyboard is connected to the correct connector. Test the computer by using PC-Doctor. • If the computer stops during the test, have the computer serviced.
0230: Shadow RAM error	The shadow RAM failed. Test your computer's memory with PC-Doctor. If you added a memory module just before turning the computer on, reinstall it. Then test the memory with PC-Doctor.
0231: System RAM error	The system RAM failed. Test your computer's memory with PC-Doctor. If you added a memory module just before turning the computer on, reinstall it. Then test the memory with PC-Doctor.
0232: Extended RAM error	The extended RAM failed. Test your computer's memory with PC-Doctor. If you have increased memory just before turning the computer on, reinstall it. Then test the memory with PC-Doctor.
0250: System battery error	The backup battery, which is used to preserve the configuration information, such as the date and time, while the computer is turned off, is depleted. Replace the battery and run the BIOS Setup Utility to verify the configuration. If you still have a problem, have the computer serviced.

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Message	Solution
0251: System CMOS checksum bad	The system CMOS might have been corrupted by an application program. The computer uses the default settings. Run the BIOS Setup Utility to reconfigure the settings. If you still see the same error code, have the computer serviced.
0271: Date and time error	Neither the date nor the time is set in the computer. Set the date and time, using the BIOS Setup Utility.
0280: Previous boot incomplete	Your computer was previously unable to complete the boot process. Turn the computer off; then turn it on to start the BIOS Setup Utility. Verify the configuration and then restart the computer either by choosing the **Exit Saving Changes** option under the **Restart** item or by pressing F10. If you still see the same error code, have the computer serviced.
1802: Unauthorized network card is plugged in - Power off and remove the miniPCI network card.	The Mini-PCI network card is not supported on this computer. Remove it.
1803: Unauthorized daughter card is plugged in - Power off and remove the daughter card.	The daughter card is not supported on this computer. Remove it.
1804: Unauthorized WAN card is plugged in - Power off and remove the WAN card.	The WAN card is not supported on this computer. Remove it.
1805: Unauthorized Wireless USB card is plugged in - Power off and remove the Wireless USB card.	The Wireless USB card is not supported on this computer. Remove it.
1830: Invalid memory configuration - Power off and install a memory module to Slot-0 or the lower slot.	The current memory configuration is not supported. If only one memory module is installed, it must be in the lower slot, not in the upper slot.

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Message	Solution
2100: Initialization error on HDD0 (Main hard disk drive)	The HDD or SSD is not working. Have the drive serviced.
2102: Initialization error on HDD1 (Ultrabay hard disk drive)	The HDD or SSD is not working. Have the drive serviced.
2110: Read error on HDD0 (Main hard disk drive)	The HDD or SSD is not working. Have the drive serviced.
2112: Read error on HDD1 (Ultrabay hard disk drive)	The HDD or SSD is not working. Have the drive serviced.
The power-on password prompt	A power-on password or a supervisor password is set. Type the password and press **Enter** to use the computer. If the power-on password is not accepted, a supervisor password might have been set. Type the supervisor password and press **Enter**. If you still see the same error message, have the computer serviced.
The hard disk password prompt	An HDD or SSD password is set. Type the password and press **Enter** to use the computer. If you still see the same error message, have the computer serviced.
Hibernation error	The system configuration changed between the time your computer entered hibernation mode and the time it left this mode, and your computer cannot resume normal operation. • Restore the system configuration to what it was before your computer entered hibernation mode. • If the memory size has been changed, re-create the hibernation file.
Operating system not found.	Verify the following: • The HDD or SSD is correctly installed. • A startable disc is in the drive If you still see the same error message, check the boot sequence, using the BIOS Setup Utility.

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Message	Solution

EMM386 Not Installed - Unable to Set Page Frame Base Address.	Edit C:\CONFIG.SYS and change a line from
	`device=C:\WINDOWS\EMM386.EXE RAM`
	to
	`device=C:\WINDOWS\EMM386.EXE NOEMS`
	and save this file.

CardBus Configuration Error - Device Disabled	Enter the BIOS Setup Utility. Press F9 and then Enter to load the default setting. Press F10 and then Enter to restart the system.
Cannot boot from any device.	Check the status of the device which you want to boot from. Device not found Check the device you want to boot from. Device error Check the device you want to boot from. No valid operating system Check that the operating system has no failure and is installed correctly. Excluded from boot order Open the BIOS Setup Utility and add the device to boot order.

Beep errors	
One short beep, pause, three short beeps, pause, three more short beeps, and one short beep	If only one memory module is installed, make sure that it is correctly installed in the lower slot. If memory modules are installed in both of the slots, make sure that they are installed correctly. If they are, and you still hear the beeps, have the computer serviced.
One long and two short beeps	The video function has a problem. Have the computer serviced.
Four cycles of four short beeps	The Security Chip has a problem. Have the computer serviced.
Five beeps	The system board has a problem. Have the computer serviced.

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If one of the following error code messages is displayed on the screen, have the computer serviced:
0175: Bad CRC1, stop POST task
0177: Bad SVP data, stop POST task. Checksum of the supervisor password in the EEPROM is not correct.
0187: EAIA data access error
0188: Invalid RFID serialization information area
0189: Invalid RFID configuration information area
0192: System Security - Embedded Security hardware tamper detected.
0260: System timer error
0270: Real time clock error
02D0: System cache error
02F4: EISA CMOS not writable
02F5: DMA test failed
02F6: Software NMI failed
02F7: Fail-safe timer NMI failed
Fan error
Thermal sensing error

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Errors without messages

Problem:

When I turn on the machine, nothing appears on the screen and the machine does not beep while starting up.

Note: If you are not sure whether you heard any beeps:

1. Turn off the computer by pressing and holding the power switch for 4 seconds or more.
2. Turn it on and listen again.

Solution:

1. Make sure that:
   - The battery is installed correctly.
   - The AC adapter is connected to the computer and the power cord is plugged into a working electrical outlet.
   - The computer is turned on. (Turn the power switch on again for confirmation.)
2. If a power-on password is set:
   a. Press any key to display the prompt for the power-on password. If the brightness level of the screen is low, increase it by pressing the Fn+Home.
   b. Type the correct password and press Enter.
3. If these items are set properly, and the screen remains blank, have the computer serviced.

Problem:

When I turn on the machine, only a white cursor appears on a blank screen.

Solution:

Note: If you have modified a partition on your HDD or SSD by using a partition software, information about that partition, or the master boot record, may have been destroyed.

1. Turn off the computer, and then turn it on again.
2. If you still see only the cursor on the screen, do the following:
   - If you have used the partition software, examine the partition on the HDD or SSD by using the software, and recover the partition if required.
   - Use either the Rescue and Recovery workspace or the recovery discs to restore the system to the factory state.

     For details about restoring the system to the factory state, see Chapter 4, “Recovery options,” on page 35.
3. If the problem persists, have the computer serviced.

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Problem:

The screen goes blank while the computer is on.

Solution:

Your screen saver or power management may be enabled.

Do either of the following:

- Move the TrackPoint or press a key to exit the screen saver.
- Press the power switch to resume from sleep (standby) or hibernation.

Problem:

The computer does not respond.

Solution:

1. Turn off the computer by pressing and holding the power switch for 4 seconds or more.
2. If the computer still does not respond, remove and reinstall the AC adapter and the battery.

Your computer might lock when it enters sleep (standby) mode during a communication operation. Disable the sleep (standby) timer when you are working on the network.

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Memory problems

Problem:

Your memory is not operating properly.

Solution:

1. Verify that the memory is installed and seated correctly in your computer.

   It may be necessary to remove all added memories to test the computer with only the factory-installed memories, and then reinstall the memory one at a time to ensure a proper connection. For the procedures to remove and reinstall a memory, refer to "Replacing memory" on page 48.
2. Check for error messages during startup.

   Follow the appropriate corrective actions for Power-on self-test (POST) error messages.
3. Verify that the latest BIOS for your computer has been installed.
4. Verify the proper memory configuration and compatibility including the maximum memory size and the memory speed.

   For details, refer to the instructions in "Replacing memory" on page 48.
5. Run PC-Doctor for Windows.

   If you cannot startup Windows, use PC-Doctor from the service partition on your hard disk drive.

Password problems

Problem:

You forgot your password.

Solution:

- If you forget your power-on password, you must take your computer to a Lenovo authorized servicer or a marketing representative to have that password canceled.
- If you forget your hard disk password, a Lenovo authorized servicer cannot reset your password or recover data from the HDD or SSD. You must take your computer to a Lenovo authorized servicer or a marketing representative to have the HDD or SSD replaced. Proof of purchase is required, and a fee will be charged for parts and service.
- If you forget your supervisor password, a Lenovo authorized servicer cannot reset your password. You must take your computer to a Lenovo authorized servicer or a marketing representative to have the system board replaced. Proof of purchase is required, and a fee will be charged for parts and service.

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Keyboard problems

Problem:

All or some keys on the keyboard do not work.

Solution:

For Windows Vista®:

1. Click **Start** → **Control Panel**.
2. Click **Hardware and Sound**, and then click **Keyboard**.
3. Select the **Hardware** tab. In the Device Properties, make sure that the Device Status is **This device is working properly**.

For Windows XP:

1. Click **Start** → **Control Panel**.
2. Click **Printers and Other Hardware**, and then click **Keyboard**.
3. Select the **Hardware** tab. In the Device Properties, make sure that the Device Status is **This device is working properly**.

If keys on the keyboard still do not work, have the computer serviced.

Problem:

A number appears when you type a letter.

Solution:

The numeric lock function is on. To disable it, press and hold Shift or Fn and then press NmLk (ScrLk).

Problem:

All or some keys on the external keyboard or numeric keypad do not work.

Solution:

Make sure that the external keyboard or numeric keypad is correctly connected to the computer.

Pointing device problems

Problem:

The scrolling or magnifying glass function does not work.

Solution:

Check the mouse driver in the Device Manager window, and make sure that the ThinkPad UltraNav® Pointing Device driver is installed.

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Sleep (standby) or hibernation problems

Problem:

The computer enters sleep (standby) mode (the sleep/standby indicator turns on) immediately after Power-on self-test (POST).

Solution:

1. Make sure that:
   - The battery is charged.
   - The operating temperature is within the acceptable range. See "Specifications" on page 70.
2. If these items are correct, have the computer serviced.

Problem:

The `critical low-battery error` message is displayed, and the computer immediately turns off.

Solution:

The battery power is getting low.

Do either of the following:

- Connect the AC adapter to the computer and plug it into an electrical outlet.
- Replace the battery with a fully charged one.

Problem:

When you take action to return from sleep (standby) mode, the computer display remains blank.

Solution:

1. Check whether an external monitor was turned off while the computer was in sleep (standby) mode.
2. Do either of the following:
   - Turn on the external monitor to display the image on it.
   - Press Fn+F7 to bring up the image on the computer screen.

     Note: If you use the Fn+F7 key combination to apply a presentation scheme, press Fn+F7 at least three times in three seconds.
3. If the problem persists, do the Solution in the following Problem.

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Problem:

While operating with the battery, the computer does not return from sleep (standby) mode, or the sleep (standby) indicator stays on and the computer does not work.

Solution:

The system may have entered sleep (standby) or hibernation mode automatically because the battery is depleted.

1. Connect the AC adapter to the computer.
2. If the sleep (standby) indicator is on, press Fn. If the sleep (standby) indicator is off, press the power switch to resume operation.
3. If you press Fn or the power switch, and the system does not return from sleep (standby) or hibernation mode, the computer stops responding and cannot be turned off:
   a. Turn off the computer by pressing and holding the power switch for 4 seconds or more. Unsaved data may be lost.
   b. If the computer still does not respond, remove and reinstall the AC adapter and the battery.

Problem:

The computer enters sleep (standby) mode unexpectedly.

Solution:

1. Make sure that the settings in Power Manager are set properly.
   a. Start Power Manager by clicking **Start** → **All programs** → **ThinkVantage** → **Power Manager**.
   b. On the **Power Plan** tab (in Windows XP, On the **Power Scheme** tab), select the name of the Plan you want. Under **System settings**, check the setting of **Enter System standby**.
   c. On the **Global Power Settings** tab, make sure that the settings under **Alarms** are set properly.
2. Make sure that no object blocks the air vents of the computer.

   When the processor overheats, the computer automatically enters sleep (standby) mode to cool down and to protect the processor and other internal components.
   a. Allow the computer to cool.
   b. Press Fn to return from sleep (standby) mode.
3. If the computer still enters sleep (standby) mode unexpectedly, the internal fan or other parts may have failed. Have the computer serviced.

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Computer screen problems

Problem:

Incorrect characters appear on the screen.

Solution:

1. Make sure that the operating system and the application program are installed correctly.
2. If they are installed and configured correctly, have the computer serviced.

Problem:

Missing, discolored, or bright dots appear on the screen every time I turn on my computer.

Solution:

This is an intrinsic characteristic of the TFT technology. Your computer's display contains multiple thin-film transistors (TFTs). A small number of missing, discolored, or bright dots on the screen might exist all the time.

Problem:

The screen is blank.

Solution:

1. Do the following:
   - Press Fn+F7 to bring up the image.

     Note: If you use the Fn+F7 key combination to apply a presentation scheme, press Fn+F7 at least three times in three seconds.
   - If you are using the AC adapter, or using the battery, and the battery status indicator is on (is green), press Fn+Home to make the screen brighter.
   - If the sleep (standby) status indicator is on (is green), press Fn to resume from the sleep (standby) mode.
2. If the problem persists, do the Solution in the following Problem.

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Problem:

The screen is unreadable or distorted.

Solution:

Make sure that:

- The screen resolution and color quality are correctly set.
- The display device driver is installed correctly.
- The monitor type is correct.

To check these settings, do as follows:

For Windows Vista:

1. Right-click on the desktop, click **Personalize**, then click **Display Settings**.
2. Check whether the screen resolution and color quality are correctly set.
3. Click **Advanced Settings**.
4. Click the **Adapter** tab.
5. Make sure that the correct device driver name is shown in the adapter information window.
   Note: The device driver name depends on the video chip that has been installed on your computer.
6. Click the **Properties** button. If you are prompted for an administrator password or confirmation, type the password or provide confirmation. Check the ″Device status″ box and make sure that the device is working properly. If not, click the **Troubleshoot** button.
7. Click the **Monitor** tab.
8. Make sure that the information is correct.
9. Click the **Properties** button. If you are prompted for an administrator password or confirmation, type the password or provide confirmation. Check the ″Device status″ box and make sure the device is working properly. If not, click the **Troubleshoot** button.

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Solution (continued):

For Windows XP:

1. Right-click on the desktop, click **Properties** to open the Display Properties window, then click the **Settings** tab.
2. Check whether the screen resolution and color quality are correctly set.
3. Click **Advanced**.
4. Click the **Adapter** tab.
5. Make sure that the correct device driver name is shown in the adapter information window.
   Note: The device driver name depends on the video chip that has been installed on your computer.
6. Click the **Properties** button. Check the ″Device status″ box and make sure that the device is working properly. If not, click the **Troubleshoot** button.
7. Click the **Monitor** tab.
8. Make sure that the information is correct.
9. Click the **Properties** button. Check the ″Device status″ box and make sure that the device is working properly. If not, click the **Troubleshoot** button.

Problem:

A message, “Unable to create overlay window,” appears when I try to start DVD playback.
-or-
I get poor or no playback while running video playback, DVD playback, or game applications.

Solution:

Do either of the following:

- If you are using 32-bit color mode, change the color depth to 16-bit mode.
- If you are using an external display device with a desktop size of 1600 × 1200 or larger (4:3), or 1680 × 1050 (16:10) or larger, reduce the refresh rate or color depth.

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Battery problems

Problem:

The battery does not charge.

-or-

The operating time for a fully charged battery is short.

-or-

The battery cannot be fully charged by the power-off method in the standard charge time for the computer.

Solution:

For details, see "Problem solving" in *Access Help*

Problem:

The computer does not operate with a fully charged battery.

Solution:

The surge protector in the battery might be active. Turn off the computer for one minute to reset the protector; then turn on the computer again.

Problem:

The computer shuts down before the battery status indicator shows empty.

-or-

The computer operates after the battery status indicator shows empty.

Solution:

Discharge and recharge the battery.

AC adapter problems

Problem:

The AC adapter is connected to the computer and the working electrical outlet, but the power adapter (power plug) icon is not displayed on the task bar. Also the AC power indicator does not light up.

Solution:

1. Make sure that the connection of the AC adapter is correct. For connecting the AC adapter, see the Setup Instructions manual included in the shipping contents of your computer.
2. If the above step is correct, turn off the computer, then disconnect the AC adapter and uninstall the main battery.
3. Reinstall the battery and reconnect the AC adapter, then turn on the computer.
4. If the power adapter icon still does not appear on the task bar and the AC power indicator does not light up, have the AC adapter and your computer serviced.

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Hard disk drive (HDD) or solid state drive (SSD) problems

Problem:

After setting a hard disk password on the HDD or SSD of the computer, you moved the drive to another computer. Now you cannot unlock the hard disk password.

Solution:

Your computer supports an enhanced password algorithm. Computers older than yours may not support such a security function.

If you have set a hard disk password with **Using Passphrase** enabled in the BIOS Setup Utility, and want to use the HDD or SSD in an older computer:

1. Remove the hard disk password on your computer.
2. Move the HDD or SSD to the older computer.

Problem:

You cannot hot-swap the HDD or SSD in the Ultrabay.

Solution:

You can hot-swap an HDD or SSD in the Ultrabay only if no hard disk password has been set. Make sure that the password for the HDD or SSD in the Ultrabay is disabled.

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Problem:

You cannot change or remove a hard disk password in the BIOS Setup Utility.

Solution:

A hard disk password can be changed or removed only if the setting of **Using Passphrase** in the BIOS Setup Utility - enabled or disabled - is the same as it was when you set the password.

If the **Hard Disk x Password** menu in the BIOS Setup Utility is grayed out and unavailable:

1. Turn off the computer.
2. Uninstall the HDD or SSD.
3. With the HDD or SSD uninstalled, turn on the computer. When the ThinkPad logo comes up, immediately press F1 to enter the BIOS Setup Utility.
4. Remove all other passwords.
5. Set **Using Passphrase** as enabled or disabled, whichever was its setting when you set the hard disk password.
6. Save the change and exit the BIOS Setup Utility.
7. Turn off the computer.
8. Reinstall the HDD or SSD.
9. Turn on the computer and enter the BIOS Setup Utility to change or remove the hard disk password.

Problem:

When you compress files or folders by use of the data compression function in Windows, and then decompress them, the process of writing to or reading from the files or folders is slow.

Solution:

Apply the disk defragmentation tool in Windows for faster access to the data.

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Fingerprint reader problems

Problem:

You cannot register or authenticate your finger.

Solution:

If your finger has any of the following conditions, you may not be able to register or authenticate it.

- Your finger is wrinkled, rough, dry, injured, stained, oily, or wet.
- The surface of your finger is very different from when you enrolled your fingerprint.

To improve the situation, try the following:

- If your hands are too dry, apply lotion to them.
- Clean or wipe your hands to remove any excess dirt or moisture from the fingers.
- Enroll and use a different finger for authentication.

Startup problems

Problem:

The Microsoft® Windows operating system will not start.

Solution:

Use the Rescue and Recovery workspace or recovery discs to help solve or identify your problem. For details about Rescue and Recovery, see Chapter 4, “Recovery options,” on page 35.

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Problem:

When you start up your computer, the operating system does not start up from the device that should start it up.

Solution:

The device that starts up the operating system may not be included in the ″Boot priority order″ list in the BIOS Setup Utility.

To check whether the device is included in the ″Boot priority order″ list, do as follows:

1. Turn off the computer, and then turn it on again.
2. When the ThinkPad logo comes up, immediately press F1 to enter the BIOS Setup Utility.
3. Select **Startup**, and press **Enter**.
4. Select **Boot**, and press **Enter**.
5. Make sure that:
   - The device is included in the ″Boot priority order″ list.
   - The device is configured so that it can start up the operating system.
6. If the device is included in the ″Excluded from boot order″ list, select it.
7. Press the x key. Now, the device is included in the ″Boot priority order″ list.
8. Configure the boot priority order to enable the device to start up the operating system.
9. To save the change, press F10. Select **Yes** and press **Enter**.

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Chapter 4. Recovery options

Introducing Rescue and Recovery

If Windows is not running properly, use the Rescue and Recovery workspace to help solve or identify your problem.

1. Turn off the computer, and then turn it on again.
2. When the ThinkPad logo comes up, immediately press the ThinkVantage button.
3. After the Rescue and Recovery workspace opens, you can do the following:
   - Rescue and Restore your files, folders, or backups.
   - Configure your system settings and passwords.
   - Communicate using the Internet and link to the support site.
   - Troubleshoot and diagnose problems using diagnostics.

For more information about using Rescue and Recovery features, see "Problem solving" in *Access Help*.

Solid state drive (SSD)

With Lenovo technologies advancing to provide you with the best engineered systems, some models are equipped with a solid state drive (SSD) for data storage. This cutting-edge technology enables notebook systems to be lighter, smaller and faster.

If your system has an SSD, use Rescue and Recovery to back up your system with external storage media such as a USB device, CD or DVD. Doing this after taking your system out of the box will save disk space, give your system a recovery starting point, and ensure protection against any threat of data loss. For more information about working with storage media, see "Problem solving" in *Access Help*.

After your initial backup, set the schedule in Rescue and Recovery to take backups at designated intervals. This will ensure minimal data loss in the event your system is hit by a malicious act, such as a worm or virus.

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Restoring the factory contents

The complete backup of all the files and programs that Lenovo preinstalled on your computer may have shipped on recovery discs with your computer or resides in a hidden protected area, or partition, of the HDD. Although hidden, the backups in the partition consume the drive space. Therefore, when checking the capacity of your HDD according to Windows, you might note that the total capacity of the storage drive appears to be smaller than anticipated. This discrepancy is explained by the contents of the hidden partition.

The Product Recovery Program contained within this area enables you to restore the complete contents of your HDD to the same state as it was when originally shipped from the factory.

If you are using the recovery discs that are shipped with your computer, the Product Recovery Program will be restored to your computer in addition to all other content originally shipped from the factory. This will take up additional capacity on your HDD or SSD if your computer did not initially ship with the Product Recovery Program.

Attention:

- All files on the primary storage drive partition (usually drive C) will be deleted in the recovery process. However, before any data is overwritten, you will be given the opportunity to save one or more files to other media.
- If your optical drive is not attached to your ThinkPad computer during recovery, DVD software and CD-recording software will not be installed. To ensure that they will be installed correctly, install the optical drive before performing a recovery operation.
- Recovery takes several hours. The length of time depends on the method you use. If you use recovery discs which you have created or purchased, recovery takes at least five hours.

Before restoring the system, initialize the settings of the BIOS Setup Utility:

1. Enter BIOS Setup Utility.
2. Press F9 to restore the default system settings. Select **Yes** and press **Enter**.
3. Press F10 to save the system settings. Select **Yes** and press **Enter**. The computer will restart.

Restoring the factory contents from the service partition

1. If possible, save all your files and shut down your operating system.
2. Turn off the computer, and then turn it on again.
3. When the ThinkPad logo comes up, immediately press the ThinkVantage button. The Rescue and Recovery workspace opens.
4. Click **Full Restore** and follow the instructions on the screen.

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Restoring the factory contents using the recovery discs

If a set of recovery discs is enclosed with your computer, or you have created or purchased recovery discs, you can restore the factory contents by using the discs in the following procedure:

1. Make sure that in the BIOS Setup Utility the startup sequence is set so that the system starts up from the recovery discs.
2. Insert the Rescue and Recovery disc into the DVD drive.
3. Restart the computer. After a short wait, the Rescue and Recovery workspace opens.
4. Click **Full Restore** and follow the instructions on the screen.

Recovering data

If you performed a backup operation using the Rescue and Recovery program, you also have one or more backups stored that reflect the contents of the HDD or SSD as it existed at various points in time. These backups might be stored on your HDD or SSD, or a network drive, or on removable media, depending on the options you selected during the backup operation.

You can use either the Rescue and Recovery program or the Rescue and Recovery workspace to restore the contents of the HDD or SSD to an earlier state using any of the stored backups. The Rescue and Recovery workspace on your HDD model runs independently of the Windows operating system. Therefore, you can start it by pressing the blue ThinkVantage button when prompted during startup.

After the Rescue and Recovery workspace opens you can perform a recovery operation, even if you are unable to start Windows.

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Chapter 5. Upgrading and replacing devices

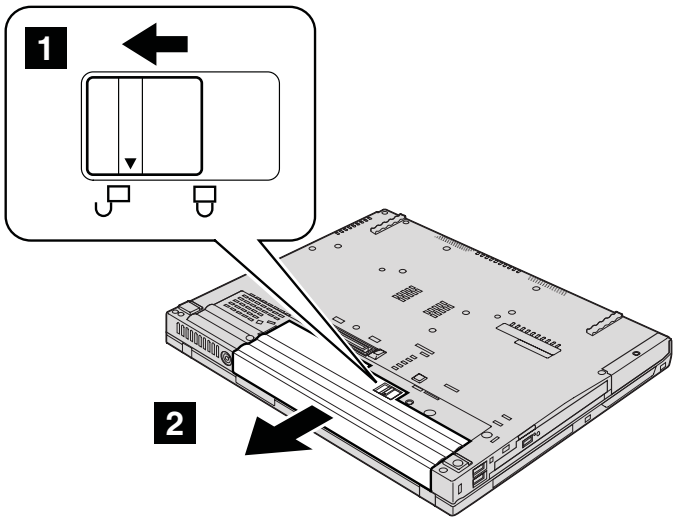
Replacing the battery

Important:

Read *Safety and Warranty Guide* before replacing the battery.

To replace the battery, do the following:

1. **Turn off the computer, or enter hibernation mode.** Then disconnect the AC adapter and all cables from the computer.
2. Close the computer display, and turn the computer over.
3. Unlock the battery latch by sliding it to the left 1 . Then, remove the battery 2 .



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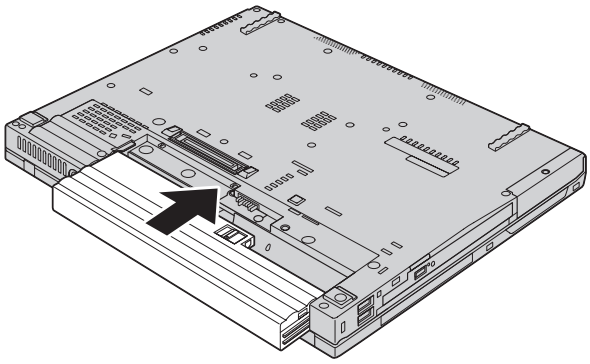
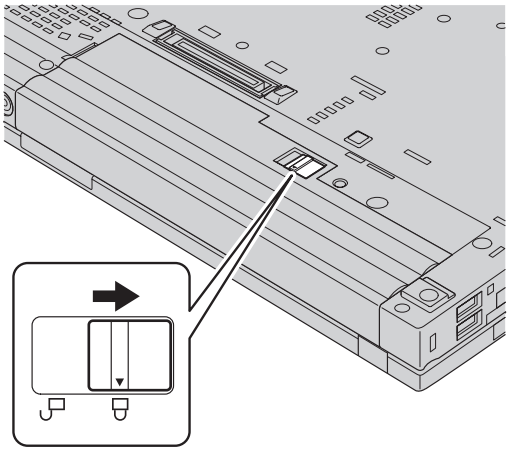
4. Install a fully charged battery.



5. Slide the battery latch to the locked position.



6. Turn the computer over again. Connect the AC adapter and the cables to the computer.

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Upgrading the hard disk drive or solid state drive

Important:

Read *Safety and Warranty Guide* before replacing the HDD or SSD.

You can replace the hard disk drive (HDD) or the solid state drive (SSD) with a new one by following the procedure below. You can purchase a new HDD or SSD from your reseller or Lenovo marketing representative.

Note:

- Replace the HDD or SSD only if you are upgrading it or having it repaired. The connectors and slot of these drives were not designed for frequent changes, or drive swapping.
- The Rescue and Recovery workspace and the Product Recovery program are not included on an optional drive.

Attention:

Handling an HDD or an SSD

- Do not drop the drive or subject it to physical shocks. Place the drive on a soft material, such as cloth, which absorbs physical shock.
- Do not apply pressure to the cover of the drive.
- Do not touch the connector.

The drive is very sensitive. Incorrect handling can cause damage and permanent loss of data on the drive. Before removing the HDD or SSD, make a backup copy of all the data on the drive, and turn the computer off. Never remove the drive while the system is operating, in standby mode, or in hibernation mode.

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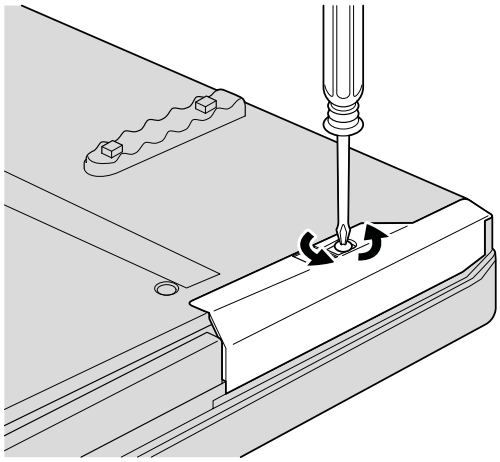
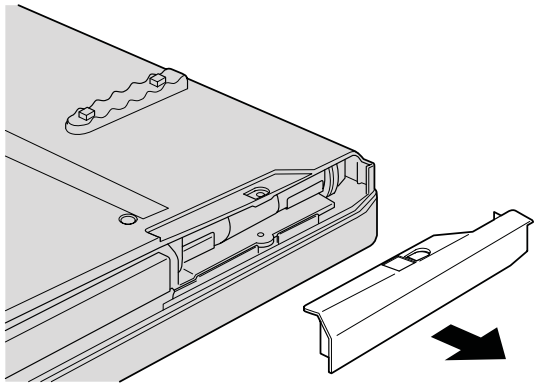
To replace the HDD, do the following:

1. **Turn off the computer**; then disconnect the AC adapter and all cables from the computer.
2. Close the computer display, and turn the computer over.
3. Remove the battery.
4. Remove the screw that secures the slot cover.



5. Remove the slot cover.



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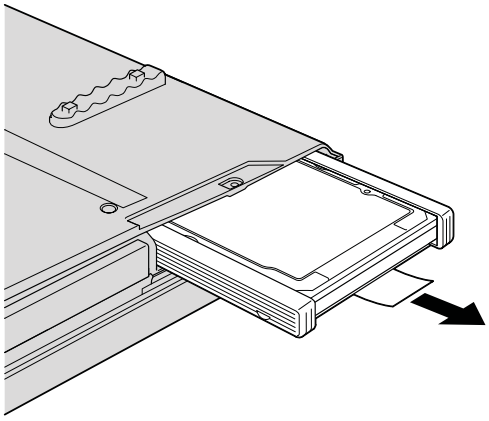
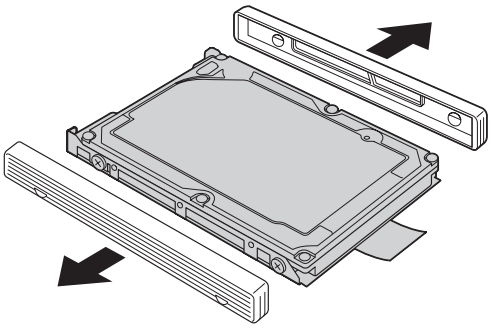
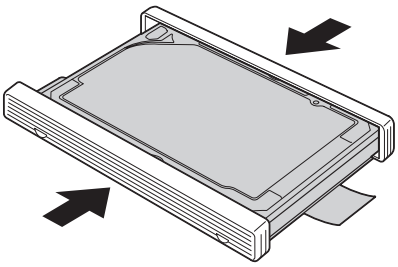
6. Remove the HDD by pulling out the tab.



7. Detach the side rubber rails form the HDD.



8. Attach the side rubber rails to a new HDD.



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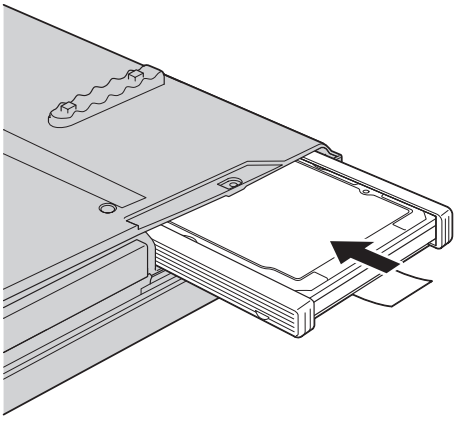
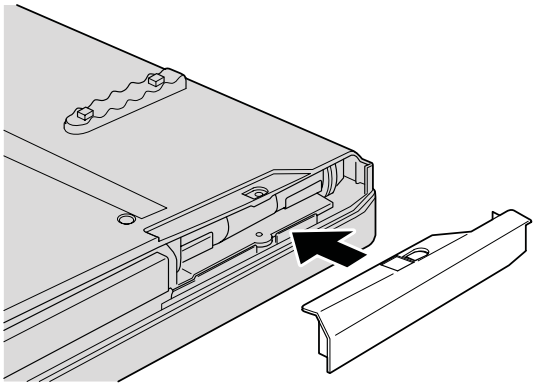
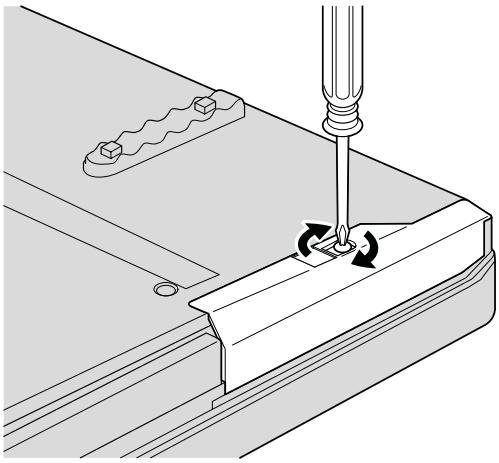
9. Insert the HDD into the slot; then press it firmly into place.



10. Reinstall the slot cover.



11. Reinstall the screw.



12. Reinstall the battery.
13. Turn the computer over again. Connect the AC adapter and the cables to the computer.

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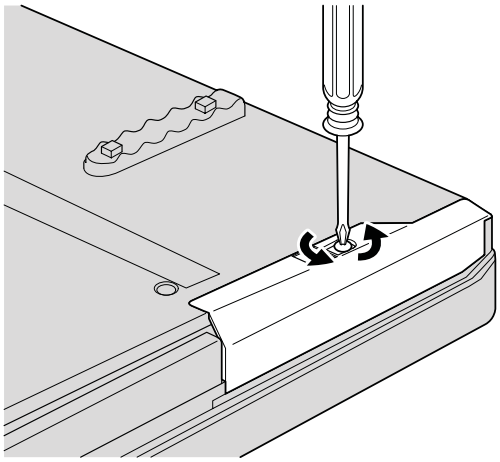
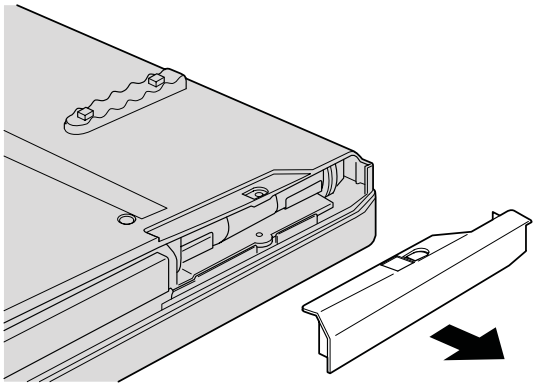
To replace the SSD, do the following:

1. **Turn off the computer**; then disconnect the AC adapter and all cables from the computer.
2. Close the computer display, and turn the computer over.
3. Remove the battery.
4. Remove the screw that secures the slot cover.



5. Remove the slot cover.



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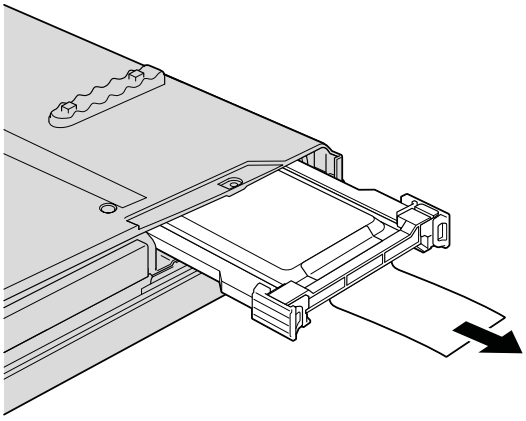
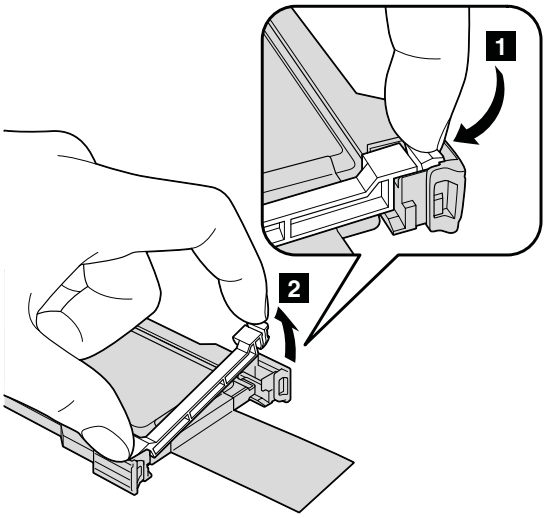
6. Remove the SSD by pulling out the tab.

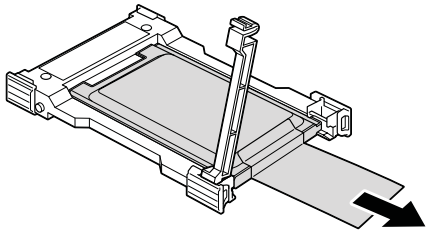


7. Release the latch with your finger in the direction shown by the arrow **1** , and lift up the bar **2** .

   Note: Do not remove the rubbers attached to the side of the adapter. To do so requires pulling hard, possibly damaging or breaking them.



8. Remove the SSD from the adapter.



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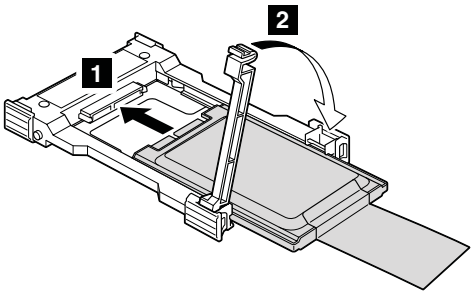
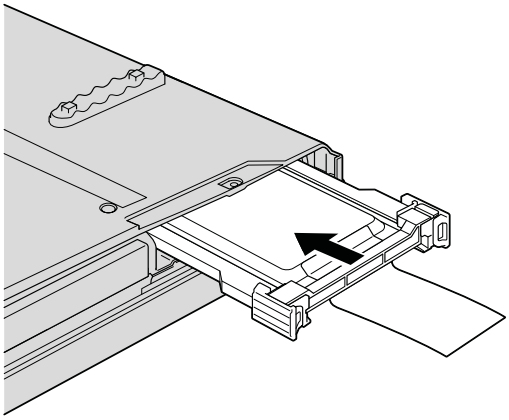
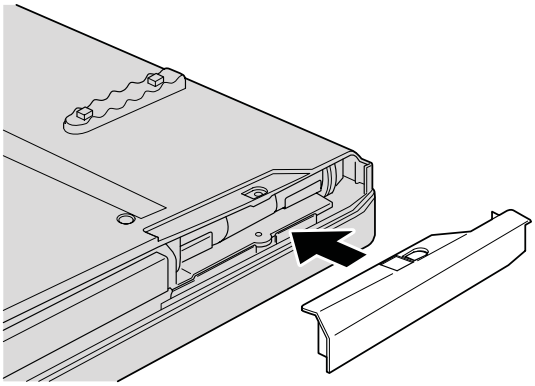
9. Insert a new SSD into the adapter **1**. Put the bar back in place and set the latch **2**.



10. Insert the SSD into the slot; then press it firmly into place.



11. Reinstall the slot cover.



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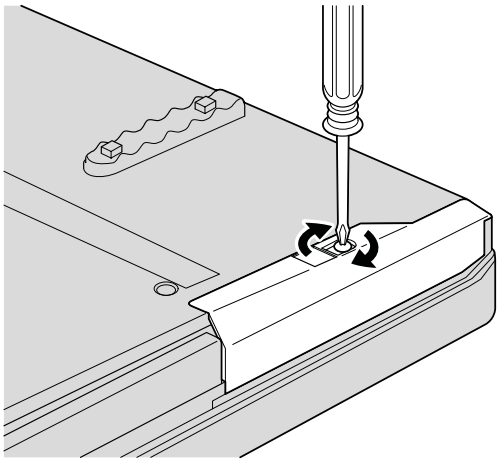
12. Reinstall the screw.



13. Reinstall the battery.
14. Turn the computer over again. Connect the AC adapter and the cables to the computer.

Replacing memory

Important:

Read *Safety and Warranty Guide* before replacing memory.

Increasing memory capacity is an effective way to make programs run faster. You can increase the amount of memory in your computer by installing a double data rate three (DDR3) synchronous dynamic random access memory (SDRAM) unbuffered small outline dual inline memory module (SO-DIMM), available as an option, in the memory slot of your computer. SO-DIMMs with different capacities are available.

Note: Use only the memory types supported by your computer. If you incorrectly install the optional memory or install an unsupported memory type, a warning beep will sound when you try to start the computer.

To install an SO-DIMM, do the following:

1. Touch a metal table or a grounded metal object. This action reduces any static electricity in your body, which could damage the SO-DIMM. Do not touch the contact edge of the SO-DIMM.
2. **Turn off the computer**; then disconnect the AC adapter and all cables from the computer.
3. Close the computer display, and turn the computer over.
4. Remove the battery.

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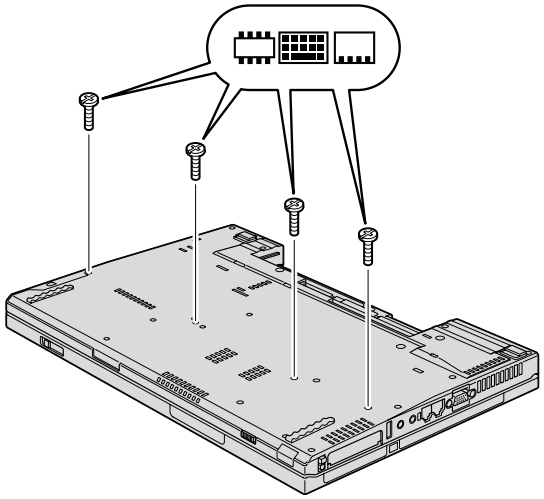
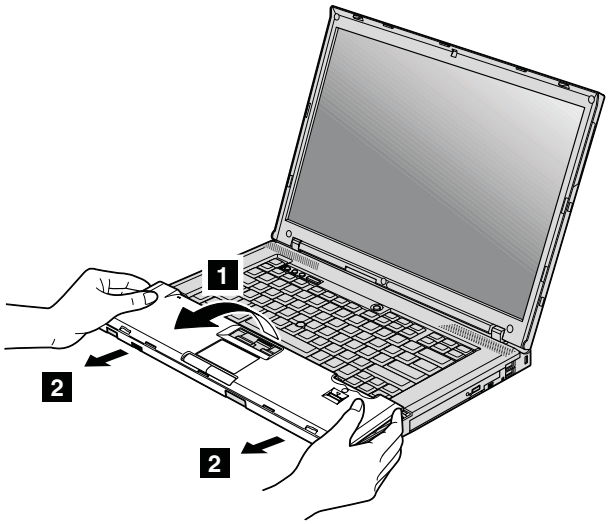
5. Remove the palm rest.
   a. Remove the four screws that secure the palm rest.



   b. Turn the computer over and open the display. Open up the palm rest in the direction shown by arrow **1** by picking up the sides, and then release the palm rest from the computer **2**.



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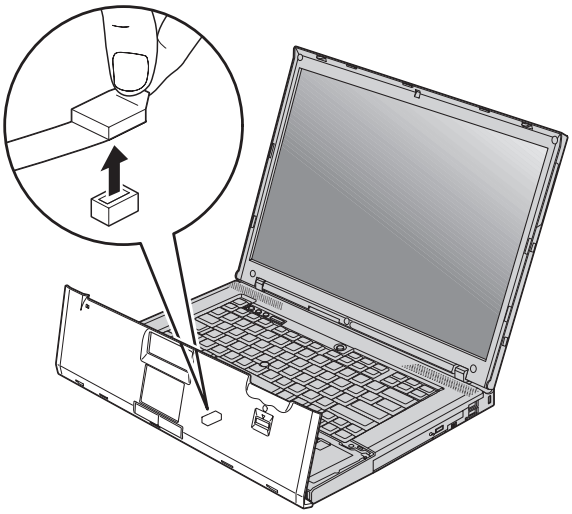
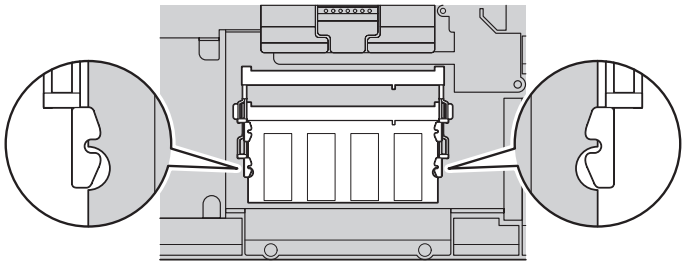
c. If your model has a touch pad or a fingerprint reader, detach the connector of the palm rest cable by pulling the tab with your fingers. Now the palm rest has been removed.



6. If the two SO-DIMMs are already installed in the memory slots, remove an SO-DIMM to make room for the new one by pressing out on the latches on both edges of the socket at the same time. Be sure to save it for future use.



7. Find the notch on the contact edge of the SO-DIMM.

   Attention: To avoid damaging the SO-DIMM, do not touch its contact edge.

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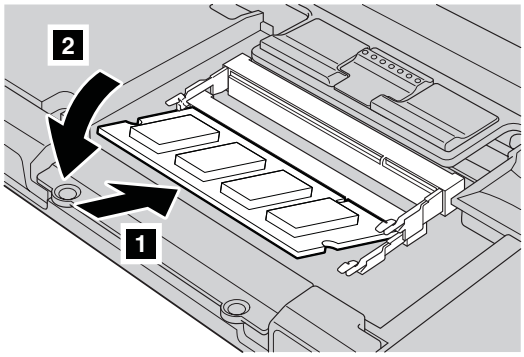
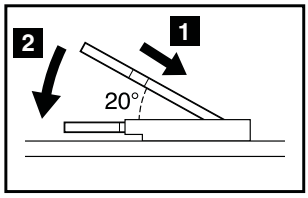
8. With the notched end of the SO-DIMM toward the contact edge side of the socket, insert the SO-DIMM into the socket at an angle of about 20 degrees 1 ; then press it firmly 2 .

   Note: If you install a memory module in only one of the two memory slots, install it in the lower slot.





9. Pivot the SO-DIMM downward until it snaps into place.
10. Make sure that the card is firmly fixed in the slot and does not move easily.

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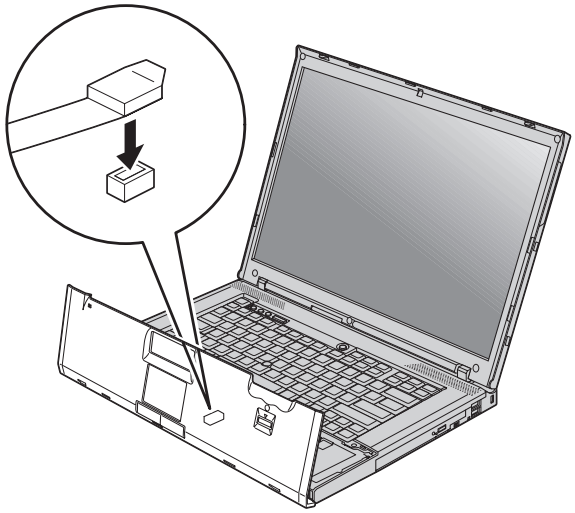
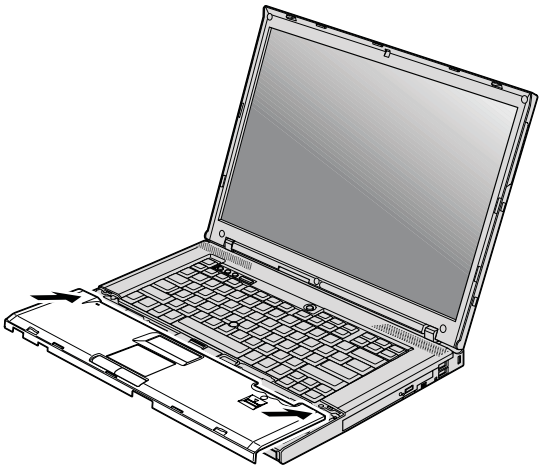
11. Reinstall the palm rest.
    a. If your model has a touch pad or a fingerprint reader, attach the connector of the palm rest cable.



    b. Press the left and right top edges of the palm rest to fit it into place.



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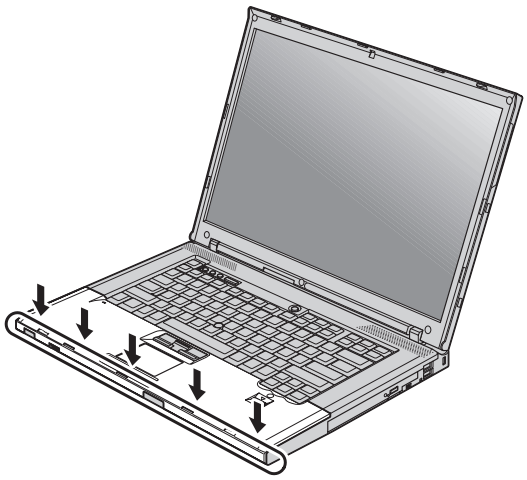
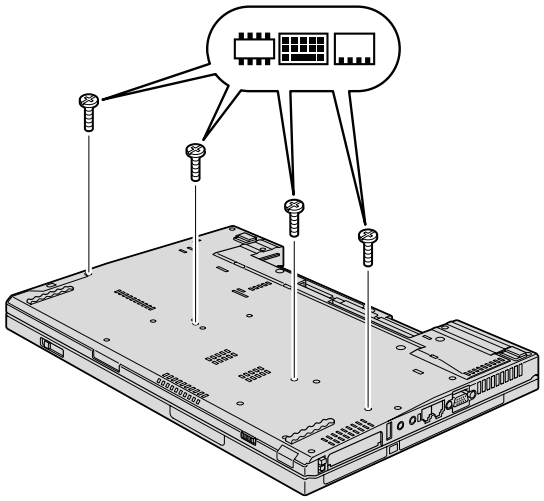
c. Push the front side of the palm rest until it clicks into place.



d. Close the computer display, and turn the computer over. Reinstall the four screws for the palm rest.



12. Reinstall the battery.
13. Turn the computer over, and reconnect the AC adapter and the cables to the computer.

To make sure that the SO-DIMM is installed correctly, do as follows:

1. Turn on the computer.
2. When the ThinkPad logo comes up, immediately press F1 to enter the BIOS Setup Utility.
3. The “Installed memory” item shows the total amount of memory installed in your computer.

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Chapter 6. Getting help and service

Getting help and service

If you need help, service, technical assistance, or just want more information about ThinkPad computers, you will find a wide variety of sources available from Lenovo to assist you. This section contains information about where to go for additional information about ThinkPad computers, what to do if you experience a problem with your computer, and whom to call for service should it be necessary.

Microsoft Service Packs are the latest software source for Windows product updates. They are available via Web download (connection charges may apply) or via a disc. For more specific information and links, please go to the Microsoft Web site at http://www.microsoft.com. Lenovo offers Up and Running technical assistance with installation of, or questions related to, Service Packs for your Lenovo-preinstalled Microsoft Windows product. For information, please contact the Customer Support Center at the phone number(s) listed in "Worldwide telephone list" on page 57. Some fees might apply.

Getting help on the Web

The Lenovo Web site on the World Wide Web has up-to-date information about ThinkPad computers and support. The address for the Personal Computing home page is http://www.lenovo.com/think.

You can find support information for your ThinkPad computer at http://www.lenovo.com/think/support. Research this Web site to learn how to solve problems, find new ways to use your computer, and learn about options that can make working with your ThinkPad computer even easier.

Calling the Customer Support Center

If you have tried to correct the problem yourself and still need help, during the warranty period, you can get help and information by telephone through the Customer Support Center. The following services are available during the warranty period:

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

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- Lenovo hardware repair - If the problem is determined to be caused by Lenovo hardware under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. Lenovo or your reseller, if authorized by Lenovo, will make selected Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered:
- Replacement or use of parts not manufactured for or by Lenovo or nonwarranted parts

  Note: All warranted parts contain a 7-character identification in the format FRU XXXXXXX
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

To determine if your machine is in warranty and when the warranty expires, go to http://www.lenovo.com/think/support, and click **Warranty**, then follow the instructions on the screen.

For the terms and conditions of the Lenovo Limited Warranty that applies to your Lenovo hardware product, see Chapter 3, "Warranty information" in the *Safety and Warranty Guide* included with your Lenovo hardware product.

If possible, be near your computer when you make your call in case the technical assistance representative needs to help you resolve a computer problem. Please ensure that you have downloaded the most current drivers and system updates, run diagnostics, and recorded information before you call. When calling for technical assistance, please have the following information available:
- Machine Type and Model
- Serial numbers of your computer, monitor, and other components, or your proof of purchase
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

The telephone numbers for your Customer Support Center location are located in the “Worldwide telephone list” on page 57 section of this guide.

Note: Telephone numbers are subject to change without notice. For the latest list of Customer Support Center telephone numbers and hours of operation,

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visit the Support Web site at http://www.lenovo.com/support/phone. If the number for your country or region is not listed, contact your Lenovo reseller or Lenovo marketing representative.

Getting help around the world

If you travel with your computer or relocate it to a country where your ThinkPad machine type is sold, your computer might be eligible for International Warranty Service, which automatically entitles you to obtain warranty service throughout the warranty period. Service will be performed by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to http://www.lenovo.com/think/support, click **Warranty**, and follow the instructions on the screen.

Worldwide telephone list

Phone numbers are subject to change without notice. For the most current phone numbers, go to http://www.lenovo.com/support/phone.

Country or Region	Telephone Number
Africa	Africa: +44 (0)1475-555-055 South Africa: +27-11-3028888 and 0800110756 Central Africa: Contact the nearest Lenovo Business Partner
Argentina	0800-666-0011 (Spanish)
Australia	131-426 (English)
Austria	01-211-454-610 (Warranty service and support) (German)
Belgium	02-225-3611 (Warranty service and support) (Dutch, French)
Bolivia	0800-10-0189 (Spanish)

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Country or Region	Telephone Number
Brazil	Sao Paulo region: (11) 3889-8986 Outside Sao Paulo region: 0800-701-4815 (Brazilian Portuguese)
Canada	1-800-565-3344 (English, French) In Toronto only call 416-383-3344
Chile	800-361-213 188-800-442-488 (Spanish)
China	Technical Support Line 800-990-8888 86-10-58851110 (Mandarin)
China (Hong Kong S.A.R.)	ThinkPad (Technical enquiry hotline): 2516-3939 (Hong Kong) ThinkPad Service Center: 2825-6580 (Hong Kong) Multimedia Home PC: 800-938-228 (Hong Kong) (Cantonese, English, Mandarin)
China (Macau S.A.R.)	ThinkPad (Technical enquiry hotline): 0800-839 (Macau) ThinkPad Service Center: 2871-5399 (Macau) Multimedia Home PC: 0800-336 (Macau) (Cantonese, English, Mandarin)
Colombia	1-800-912-3021 (Spanish)
Costa Rica	0-800-011-1029 (Spanish)
Croatia	0800-0426
Cyprus	+357-22-841100
Czech Republic	+420-2-7213-1316
Denmark	7010-5150 (Warranty service and support) (Danish)
Dominican Republic	1-866-434-2080 (Spanish)
Ecuador	1-800-426911 (Spanish)
Egypt	+202-35362525
El Salvador	800-6264 (Spanish)
Estonia	+372 66 00 800 +372 6776793

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Country or Region	Telephone Number
Finland	+358-800-1-4260 (Warranty service and support) (Finnish)
France	Hardware 0810-631-213 (Warranty service and support) Software 0810-631-020 (Warranty service and support) (French)
Germany	01805-25-35-58 (Warranty service and support) (German)
Greece	+30-210-680-1700
Guatemala	1800-624-0051 (Spanish)
Honduras	Tegucigalpa: 232-4222 San Pedro Sula: 552-2234 (Spanish)
India	1800-425-6666 or +91-80-2678-8970 (English)
Indonesia	800-140-3555 (English) 62-21-251-2955 (Bahasa Indonesian)
Ireland	01-881-1444 (Warranty service and support) (English)
Israel	Givat Shmuel Service Center: +972-3-531-3900 (Hebrew, English)
Italy	+39-800-820094 (Warranty service and support) (Italian)
Japan	ThinkPad Products Toll Free: 0120-20-5550 International: +81-46-266-4716 The above numbers will be answered with a Japanese language voice prompt. For telephone support in English, please wait for the Japanese voice prompt to end, and an operator will answer. Please say ″English support please,″ and your call will be transferred to an English speaking operator.
Korea	1588-5801 (Korean)
Latvia	+371 7070360
Lithuania	+370 5 278 66 00
Luxembourg	+352-360-385-343 (French)
Malaysia	1800-88-8558 (English, Bahasa, Melayu)
Malta	+35621445566
Mexico	001-866-434-2080 (Spanish)

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Country or Region	Telephone Number
Middle East	+44 (0)1475-555-055
Netherlands	+31-20-514-5770 (Dutch)
New Zealand	0800-733-222 (English)
Nicaragua	001-800-220-1830 (Spanish)
Norway	8152-1550 (Warranty service and support) (Norwegian)
Panama	206-6047 001-866-434-2080 (Lenovo Customer Support Center- toll Free) (Spanish)
Peru	0-800-50-866 (Spanish)
Philippines	1800-1888-1426 (English) 63-2-995-8420 (Filipino)
Poland	+48-22-878-6999
Portugal	+351 21 892 7046 (Portuguese)
Romania	+4-021-224-4015
Russia	Moscow: +7 (495) 258 6300 Toll free: 8 800 200 6300 (Russian)
Singapore	1800-3172-888 (English, Bahasa, Melayu)
Slovakia	+421-2-4954-5555
Slovenia	+386-1-200-50-60
Spain	91-714-7983 0901-100-000 (Spanish)
Sri Lanka	+9411 2493547 +9411 2493548 (English)
Sweden	077-117-1040 (Warranty service and support) (Swedish)
Switzerland	0800-55-54-54 (Warranty service and support) (German, French, Italian)
Taiwan	886-2-8723-9799 or 0800-000-700 (Mandarin)
Thailand	1-800-299-229 (Thai)
Turkey	00800-4463-2041 (Turkish)

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Country or Region	Telephone Number
United Kingdom	08705-500-900 (Standard warranty support) (English)
United States	1-800-426-7378 (English)
Uruguay	000-411-005-6649 (Spanish)
Venezuela	0-800-100-2011 (Spanish)
Vietnam	For northern area and Hanoi: 84-4-843-6675 For southern area and Ho Chi Minh City: 84-8-829-5160 (English, Vietnamese)

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Appendix A. Warranty information

This Appendix provides information regarding the warranty period and type of warranty service applicable to your Lenovo hardware product in your country or region. For the terms and conditions of the Lenovo Limited Warranty that applies to your Lenovo hardware product, see Chapter 3, Warranty Information in the *Safety and Warranty Guide* included with your Lenovo hardware product.

Machine Type	Country or Region of Purchase	Warranty period	Types of Warranty Service
2055, 2089, 4061, 4062	US, Canada, Mexico, Brazil and Australia	Parts and Labor - 3 years Battery pack - 1 year	3 1
	Japan	Parts and Labor - 1 year Battery pack - 1 year	3 1
	Other	Parts and Labor - 3 years Battery pack - 1 year	4 1
2056, 2241, 4063	All	Parts and Labor - 3 years Battery pack - 1 year	2 1
2081, 2088, 4058	US, Canada, Mexico, Brazil, Australia and Japan	Parts and Labor - 1 year Battery pack - 1 year	3 1
	Other	Parts and Labor - 1 year Battery pack - 1 year	4 1
2082	US, Australia	Parts and Labor - 3 years Battery pack - 1 year	3 1
	Asia Pacific	Parts and Labor - 3 years Battery pack - 1 year	4 1
2083, 2246, 4064	US, Canada, Mexico, Brazil, Australia and Japan	Parts and Labor - 4 years Battery pack - 1 year	3 1
	Other	Parts and Labor - 4 years Battery pack - 1 year	4 1
2087, 2247, 4065	All	Parts and Labor - 4 years Battery pack - 1 year	2 1

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Machine Type	Country or Region of Purchase	Warranty period	Types of Warranty Service
2242, 2261	US, Japan	Parts and Labor - 1 year Battery pack - 1 year	3 1
	Asia Pacific	Parts and Labor - 1 year Battery pack - 1 year	4 1
2243	Australia	Parts and Labor - 3 years Battery pack - 1 year	3 1
	Asia Pacific	Parts and Labor - 3 years Battery pack - 1 year	4 1

Types of warranty service

1. **Customer Replaceable Unit (″CRU″) Service**

   Under CRU Service, your Service Provider will ship CRUs to you for installation by you. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request. CRUs that are easily installed by you are called Self-service CRUs, while Optional-service CRUs may require some technical skill and tools. Installation of Self-service CRUs is your responsibility. You may request that a Service Provider install Optional-service CRUs under one of the other types of warranty service designated for your product. An optional service offering may be available for purchase from Lenovo to have Lenovo install Self-service CRUs for you. You may find a list of CRUs and their designation in the publication that ships with your product or at http://www.lenovo.com/CRUs. The requirement to return a defective CRU, if any, will be specified in the materials shipped with a replacement CRU. When return is required, 1) return instructions, a prepaid return shipping label, and a container will be included with the replacement CRU; and 2) you may be charged for the replacement CRU if your Service Provider does not receive the defective CRU within thirty (30) days of your receipt of the replacement.

2. **On-site Service**

   Under On-Site Service, your Service Provider will either repair or exchange the product at your location. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo product. For some products, certain repairs may require your Service Provider to send the product to a designated service center.

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3. **Courier or Depot Service**

   Under Courier or Depot Service, your product will be repaired or exchanged at a designated service center, with shipping arranged by your Service Provider. You are responsible for disconnecting the product. A shipping container will be provided to you for you to return your product to a designated service center. A courier will pick up your product and deliver it to the designated service center. Following its repair or exchange, the service center will arrange the return delivery of the product to you.

4. **Customer Carry-In or Mail-In Service**

   Under Customer Carry-In or Mail-In Service, your product will be repaired or exchanged at a designated service center, with delivery or shipping arranged by you. You are responsible to deliver or mail, as your Service Provider specifies, (prepaid by you unless specified otherwise) the product, suitably packaged to a designated location. After the product has been repaired or exchanged, it will be made available for your collection. Failure to collect the product may result in your Service Provider disposing of the product as it sees fit. For Mail-in Service, the product will be returned to you at Lenovo's expense, unless your Service Provider specifies otherwise.

5. **Product Exchange Service**

   Under Product Exchange Service, Lenovo will ship a replacement product to your location. You are responsible for its installation and verification of its operation. The replacement product becomes your property in exchange for the failed product, which becomes the property of Lenovo. You must pack the failed product in the shipping carton used to ship the replacement product and return it to Lenovo. Transportation charges, both ways, are paid by Lenovo. Failure to use the carton in which the replacement product was received may result in your responsibility for damage to the failed product during shipment. You may be charged for the replacement product if Lenovo does not receive the failed product within thirty (30) days of your receipt of the replacement product.

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Appendix B. Customer Replaceable Units (CRUs)

Customer Replaceable Units (CRUs) are computer parts that the customer can upgrade or replace. There are two types of CRU: self-service and optional-service. Self-service CRUs are easy to install. They may be standalone or latched, or require a screwdriver to remove a maximum of two screws, whereas optional-service CRUs require some technical skill, as well as tools such as a screwdriver. However, both self-service and optional-service CRUs are safe for the customer to remove and replace.

Customers are responsible for replacing all self-service CRUs. Optional-service CRUs can be removed and installed by customers or, during the warranty period, by a Lenovo service technician.

Lenovo notebook computers contain both self-service and optional-service CRUs:

- **Self-service CRUs:** these CRUs can be unplugged, or are secured by no more than two screws. Examples of this type of CRU are the AC adapter, the power cord, the battery, and the hard drive. In some products, such components as memory, wireless cards, notebook keyboards, and palm rests with fingerprint reader and touchpad may also be CRUs.
- **Optional-service CRUs:** these CRUs are isolated parts within the computer that are concealed by an access panel, which is typically secured by more than two screws. Once the access panel is removed, the CRU is visible. Both types of CRU are listed in the table on the following page.

Online *Access Help* and the Lenovo Limited Warranty-01 (LLW) warranty URL "http://www.lenovo.com/CRUs" provide instructions for replacing self-service and optional-service CRUs. To start the Access Help program, click **Start**, move the pointer to **All Programs**; then to **ThinkVantage**. Click **Access Help**. CRU URL offers three options: auto detect, "key in the machine type," and a "drop down and select." Additionally, the Service and Troubleshooting Guide (this guide) and Setup Instructions provide instructions for several critical CRUs.

If you are unable to access these instructions or if you have difficulty replacing a CRU, you can use either of the following additional resources:

- The Online Hardware Maintenance Manual and Online Videos, available from the Support Web site http://www.lenovo.com/think/support/site.wss/document.do?lndocid=part-video.

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- The Customer Support Center. For the telephone number of the Support Center for your country or region, see “Worldwide telephone list” on page 57.

Note: Use only computer parts provided by Lenovo. For warranty information about the CRUs for your machine type, see Chapter 3, Warranty Information in the *Safety and Warranty Guide***.**

The following table provides a list of CRUs for your computer and tells where to find the replacement instructions.

	Service and Troubleshooting Guide	**Setup Instructions**	**Access Help**	**Online Hardware Maintenance Manual**	**Online Video**
Self-service CRUs					
AC adapter		X			
Power cord for AC adapter		X			
TrackPoint cap			X		
Battery	X	X	X	X	X
Storage device (HDD or SSD)	X		X	X	X
Ultrabay device			X	X	X
Optional-service CRUs					
Memory	X		X	X	X
Palm rest	X		X	X	X
PCI Express Mini Card for wireless LAN/WiMAX			X	X	X
PCI Express Mini Card for wireless WAN			X	X	X
Intel® Turbo Memory card			X	X	X
Keyboard			X	X	X

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Appendix C. Features and Specifications

Features

Processor

- See the system properties of your computer. You can do this as follows:

  Click **Start**, right-click **Computer** (in Windows XP, **My Computer**); then from the pull down menu select **Properties**.

Memory

- Double data rate (DDR) 3 synchronous dynamic random access memory

Storage device

- 1.8-inch (46 mm) solid state drive or 2.5-inch (64 mm) hard disk drive

Display

The color display uses TFT technology:

- Size: 15.4 inch (391 mm)

  Resolution:
  - LCD: 1920-by-1200, 1680-by-1050, 1280-by-800
  - External monitor: Up to 2560-by-1600
- Brightness control
- ThinkLight®
- Integrated camera (on some models)

Keyboard

- 89-key, 90-key, or 94-key
- UltraNav (TrackPoint and touch pad)
- Fn key function
- ThinkVantage button
- Volume control buttons

Interface

- External-monitor connector
- Stereo headphone jack
- Microphone jack
- 3 Universal Serial Bus (USB) connectors
- IEEE 1394 connector
- RJ11 Modem connector
- RJ45 Ethernet connector
- Serial Ultrabay Slim
- Docking connector

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Combination card slot for PC Card, Express Card, Smart Card or Flash Media Card (depending on the model)
- Express Card and PC Card
- Express Card and Smart Card

Optical drive
- Combo, Multi-Burner, or Blu-ray drive, depending on the model

Wireless features
- Integrated wireless LAN
- Integrated Bluetooth (on some models)
- Integrated wireless WAN
- Integrated wireless USB
- Integrated WiMax

Digital media reader
- 7-in-1 digital media reader slot (on some models)

Security features
- Fingerprint reader (on some models)

Specifications

Size
- Width: 357.5 mm (14.1 inch)
- Depth: 255 mm (10.0 inch)
- Height: 29.7 to 33.5 mm (1.17 inch to 1.32 inch)

Environment
- Maximum altitude without pressurization: 3048 m (10,000 ft)
- Temperature
  - At altitudes up to 2438 m (8000 ft)
    Operating: 5.0°C to 35.0°C (41°F to 95°F)
    Non-operating: 5.0°C to 43.0°C (41°F to 109°F)
  - At altitudes above 2438 m (8000 ft)
    Maximum temperature when operating under the unpressurized condition: 31.3°C (88°F)

  Note: When you charge the battery pack, its temperature must be at least 10°C (50°F).
- Relative humidity:
  - Operating: 8% to 80%
  - Non-operating: 5% to 95%

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Heat output
- 65 W (222 Btu/hr) maximum or 90 W (307 Btu/hr) maximum (depending on the model)

Power source (AC adapter)
- Sine-wave input at 50 to 60 Hz
- Input rating of the AC adapter: 100-240 V AC, 50 to 60 Hz

Battery pack
- Lithium-ion (Li-Ion) battery pack
  - Nominal voltage: 10.8 V
  - Capacity: 5.2 AH or 7.8 AH, depending on the model

Battery life
- For percentage of remaining battery power, see the Power Manager Gauge on the task bar.

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Appendix D. Notices

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

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Lenovo (United States), Inc.
1009 Think Place - Building One
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Export classification notice

This product is subject to the United States Export Administration Regulations (EAR) and has an Export Classification Control Number (ECCN) of 4A994.b. It can be re-exported except to any of the embargoed countries in the EAR E1 country list.

Electronic emissions notices

The following information refers to ThinkPad T500 and W500, machine type 2055, 2056, 2081, 2082, 2083, 2087, 2088, 2089, 2241, 2242, 2243, 2246, 2247, 2261, 4058, 4061, 4062, 4063, 4064, and 4065.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, used, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from Lenovo authorized dealers. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables or connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible party:

Lenovo (United States) Incorporated
1009 Think Place - Building One
Morrisville, NC 27560
Telephone: 1-919-294-5900

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the installation of non-Lenovo option cards.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22/European

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Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

EU-EMC Directive (2004/108/EC) EN 55022 class B Statement of Compliance

Deutschsprachiger EU Hinweis

Hinweis für Geräte der Klasse B EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse B ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem “Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher “Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse B.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

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Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:
Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse B.

Japanese VCCI Class B statement

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取扱説明書に従って、正しい取り扱いをして下さい。

EU WEEE Statements

The Waste Electrical and Electronic Equipment (WEEE) mark applies only to countries within the European Union (EU) and Norway. Appliances are labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. For additional WEEE information go to: http://www.lenovo.com/lenovo/environment.

Notice for users in the U.S.A.

California Perchlorate Information:

Products containing CR (manganese dioxide) lithium coin cell batteries may contain perchlorate.

Perchlorate Material — special handling may apply. See the flowing web site:

http://www.dtsc.ca.gov/hazardouswaste/perchlorate

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ENERGY STAR model information

ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy aimed at saving money and protecting the environment through energy efficient products and practices.

Lenovo is proud to offer our customers products with the ENERGY STAR qualified designation. Lenovo computers of the following machine types, if the ENERGY STAR mark is affixed, have been designed and tested to conform to the ENERGY STAR 4.0 program requirements for computers.

2055, 2056, 2081, 2082, 2083, 2087, 2088, 2089, 2241, 2242, 2243, 2246, 2247, 2261, 4058, 4061, 4062, 4063, 4064, 4065

By using ENERGY STAR qualified products and taking advantage of the power-management features of your computer, you can help reduce the consumption of electricity. Reduced electrical consumption can contribute to potential financial savings, a cleaner environment, and the reduction of greenhouse gas emissions.

For more information about ENERGY STAR, visit the following Web site:

http://www.energystar.gov

Lenovo encourages you to make efficient use of energy an integral part of your day-to-day operations. To help in this endeavor, Lenovo has preset the following power-management features to take effect when your computer has been inactive for a specified length of time:

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Windows XP	Windows Vista
• **Power plan: Energy Star at AC mode** Turn off monitor: After 10 minutes Turn off hard disks: After 15 minutes System standby: After 25 minutes System hibernates: Never	• **Power plan: Energy Star at AC mode** Turn off the display: After 10 minutes Put the computer to sleep: After 25 Advanced power settings: - Turn off hard disks: After 15 minutes - Hibernate: Never

To awaken your computer from Sleep (Windows Vista) or System Standby (Windows XP) mode, press Fn key on your keyboard. For more information about these settings, see your Windows Help and Support information system.

The Wake on LAN® function is set to Enable when your Lenovo computer is shipped from the factory, and the setting remains valid even when the computer is in Sleep or Standby mode. If you do not need to have Wake on LAN set to Enable while your computer is in Sleep or Standby mode, you can reduce the power consumption and prolong the time in Sleep or Standby mode, by switching the setting of Wake on LAN for Sleep or Standby mode to Disable. To switch the setting of Wake on LAN, go to Device Manager and do as follows:

For Windows Vista:

1. Click **Start** → **Control panel**.
2. Click **Hardware and Sound** → **Device Manager**.
3. In the Device Manager window, expand **Network adapters**.
4. Right-click your network adapter device, and click **Properties**.
5. Click the **Power Management** tab.
6. Clear the **Allow this device to wake the computer** check box.
7. Click **OK**

For Windows XP:

1. Click **Start** → **Control panel**.
2. Click **Performance and Maintenance** → **System**.
3. Click the **Hardware** tab, and click **Device Manager**.
4. In the Device Manager window, expand **Network adapters**.
5. Right-click your network adapter device, and click **Properties**.
6. Click the **Power Management** tab.

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7. Clear the **Allow this device to bring the computer out of standby** check box.
8. Click **OK**.

Notice for Regulatory information

The latest Regulatory Notice has been uploaded on the Web site. To refer to it, go to http://www.lenovo.com/think/support, click Troubleshooting, and then click User's guides and manuals.

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Rescue and Recovery
ThinkVantage®
ThinkLight®
TrackPoint®
Ultrabay
Ultrabay Enhanced
UltraNav®

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Index

A

AC adapter
  troubleshooting 30
Access Help 1, 11, 15
additional information
  for Access Help 3

B

battery
  replacing 39
  troubleshooting 30
BIOS Setup Utility 12
  initializing 36

C

carrying the computer 6
cleaning
  computer cover 8
  computer display 8
  keyboard 8
computer display
  cleaning 8
computer screen
  troubleshooting 27
CRU (customer replaceable units) 67
Customer Replaceable Unit (CRU) 67
customer support center 55
  worldwide telephone list 57

D

diagnosing
  storage device 13
  system 14
diagnosing problems 13
drives
  handling 6

E

error messages
  troubleshooting 15

F

factory contents
  restoring 36
features
  hardware 69
features and specifications 69
finding information 1
fingerprint reader
  caring for 7
  troubleshooting 33
frequently asked questions 11

H

hard disk drive
  diagnosing 13
  troubleshooting 31
  upgrading 41
help and service 55
hibernation mode
  troubleshooting 25

I

important instructions v
important tips 5

K

keyboard
  cleaning 8
  troubleshooting 24

M

memory
  replacing 48
  troubleshooting 23
modem connection 6

N

negative ions 5
notices 73
  electronic emissions 74
  EU environmental 77
  Export classification 74
  FCC statement 74
  for US users 77
  Regulatory information 80

P

packing material 5
password
  setting 7
  troubleshooting 23
PC-Doctor 13, 14
  for Windows 13
pointing device
  troubleshooting 24
product features 69
product specifications 70
product warranty 63
  International Warranty Service 57
Productivity Center 2
publication guide 1

R

recovering data 37
recovery discs
  restoring the factory contents 37
recovery options 35
registering your computer 6
Regulatory Notice 2
replacing devices 39
Rescue and Recovery 2, 35
Rescue and Recovery workspace 14
restoring the factory contents 36

S

Safety and Warranty Guide 1
service and help 55
service partition
  diagnosing the storage device 13
  diagnosing the system 14
  restoring the factory contents 36
Setup Instructions 1
sleep mode
  troubleshooting 25
solid state drive (SSD) 35
  diagnosing 13
  troubleshooting 31
  upgrading 41
specifications
  hardware 70
startup problems
  troubleshooting 33
storage media
  handling 6

T

taking care of your computer 5
ThinkVantage button 1, 2
tips, important 5
trademarks 81
troubleshooting 15
  AC adapter 30
  battery 30
  computer screen 27

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troubleshooting *(continued)*
error messages 15
errors without messages 21
fingerprint reader 33
keyboard 24
memory 23
password 23
pointing device 24
sleep or hibernation 25
startup problems 33
storage device 31

U

upgrading devices 39

W

warranty information 63
Web help 55
worldwide support telephone list 57

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ThinkPad

Part Number: 44C9800

Printed in China

(1P) P/N: 44C9800

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ThinkPad

ThinkPad®
Safety and Warranty Guide

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Note

Before using the product, be sure to read Chapter 1, “Important safety information,” on page 1 first.

Second Edition (June 2008)

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Contents

Read this first v

Chapter 1. Important safety information . . 1
Conditions that require immediate action . . 1
Safety guidelines 2
Service and upgrades 3
Power cords and power adapters 4
Extension cords and related devices . . . 5
Plugs and outlets. 5
Power supply statement 6
External devices 6
Batteries. 7
Rechargeable battery notice 8
Lithium coin cell battery notice 9
Heat and product ventilation 10
CD and DVD drive safety 11
Electrical current safety information . . . 12
Modem safety information 13
Laser compliance statement 13
Liquid crystal display (LCD) notice . . . 15
Using headphones or earphones 15
Additional safety information 16

Chapter 2. Operating environment and other important notices 17
Operating environment 17
Static electricity prevention 17
Cleaning and maintenance 18
Data safety 18

Chapter 3. Warranty information 19
Lenovo Limited Warranty 19
Warranty Information 23
Suplemento de Garantía para México . . . 25

Trademarks 27

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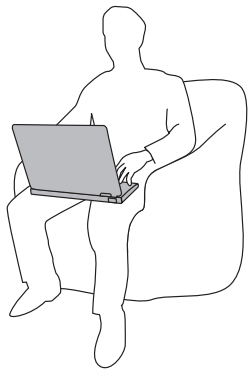
Read this first

Be sure to follow the important tips given here to continue to get the most use and enjoyment out of your computer. Failure to do so might lead to discomfort or injury, or cause your computer to fail.

Protect yourself from the heat that your computer generates.



When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become *hot*. The temperature they reach depends on the amount of system activity and the level of charge in the battery.

Extended contact with your body, even through clothing, could cause discomfort or even a skin burn.

- *Avoid* keeping your hands, your lap, or any other part of your body in contact with a hot section of the computer for any extended time.
- Periodically *take breaks* from using the keyboard by lifting your hands from the palm rest.

Protect yourself from the heat generated by the AC adapter.

When the AC adapter is connected to an electrical outlet and your computer, it generates heat.

Extended contact with your body, even through clothing, may cause a skin burn.

- *Do not* place the AC adapter in contact with any part of your body while it is in use.
- *Never* use it to warm your body.

Prevent your computer from getting wet.

- To avoid spills and the danger of electrical shock, keep liquids away from your computer.

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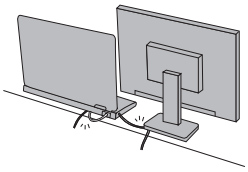
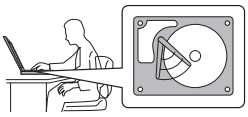
Protect the cables from being damaged.



Applying strong force to cables may damage or break them.

- Route communication lines, or the cables of an AC adapter, a mouse, a keyboard, a printer, or any other electronic device, so that they cannot be walked on, tripped over, pinched by your computer or other objects, or in any way subjected to treatment that could interfere with the operation of your computer.

Protect your computer and data when moving it.



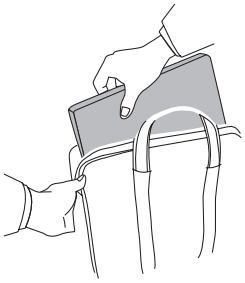
- Before moving your computer, do one of the following, and make sure that the power-on indicator is off or the power switch is not lit:
  - Turn it off.
  - Press Fn+F4 to put it in sleep (standby) mode.
  - Press Fn+F12 to put it in hibernation mode.

This will help to prevent damage to the computer, and possible loss of data.

Handle your computer gently.

- *Do not* drop, bump, scratch, twist, hit, vibrate, push, or place heavy objects on your computer, display, or external devices.

Carry your computer carefully.



- Use a quality carrying case that provides adequate cushioning and protection.
- *Do not* pack your computer in a tightly packed suitcase or bag.

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Chapter 1. Important safety information

Note:

Read important safety information first.

This information can help you safely use your notebook personal computer. Follow and retain all information included with your computer. The information in this document does not alter the terms of your purchase agreement or the Lenovo™ Limited Warranty. For more information, see Chapter 3, “Warranty information,” on page 19.

Customer safety is important. Our products are developed to be safe and effective. However, personal computers are electronic devices. Power cords, power adapters, and other features can create potential safety risks that can result in physical injury or property damage, especially if misused. To reduce these risks, follow the instructions included with your product, observe all warnings on the product and in the operating instructions, and review the information included in this document carefully. By carefully following the information contained in this document and provided with your product, you can help protect yourself from hazards and create a safer computer work environment.

Note: This information includes references to power adapters and batteries. In addition to notebook computers, some products (such as speakers and monitors) ship with external power adapters. If you have such a product, this information applies to your product. In addition, computer products contain a coin-sized internal battery that provides power to the system clock even when the computer is unplugged, so the battery safety information applies to all computer products.

Conditions that require immediate action

Products can become damaged due to misuse or neglect. Some product damage is serious enough that the product should not be used again until it has been inspected and, if necessary, repaired by an authorized servicer.

As with any electronic device, pay close attention to the product when it is turned on. On very rare occasions, you might notice an odor or see a puff of smoke or sparks vent from your product. Or you might hear sounds like popping, cracking or hissing. These conditions might merely mean that an internal electronic component has failed in a safe and controlled manner. Or, they might indicate a potential safety issue. However, do not take risks

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or attempt to diagnose the situation yourself. Contact the Customer Support Center for further guidance. For a list of Service and Support phone numbers, see the following Web site:

http://www.lenovo.com/support/phone

Frequently inspect your computer and its components for damage or wear or signs of danger. If you have any question about the condition of a component, do not use the product. Contact the Customer Support Center or the product manufacturer for instructions on how to inspect the product and have it repaired, if necessary.

In the unlikely event that you notice any of the following conditions, or if you have any safety concerns with your product, stop using the product and unplug it from the power source and telecommunication lines until you can speak to the Customer Support Center for further guidance.

- Power cords, plugs, power adapters, extension cords, surge protectors, or power supplies that are cracked, broken, or damaged.
- Signs of overheating, smoke, sparks, or fire.
- Damage to a battery (such as cracks, dents, or creases), discharge from a battery, or a buildup of foreign substances on the battery.
- A cracking, hissing or popping sound, or strong odor that comes from the product.
- Signs that liquid has been spilled or an object has fallen onto the computer product, the power cord or power adapter.
- The computer product, power cord, or power adapter has been exposed to water.
- The product has been dropped or damaged in any way.
- The product does not operate normally when you follow the operating instructions.

Note: If you notice these conditions with a product (such as an extension cord) that is not manufactured for or by Lenovo, stop using that product until you can contact the product manufacturer for further instructions, or until you get a suitable replacement.

Safety guidelines

Always observe the following precautions to reduce the risk of injury and property damage.

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Service and upgrades

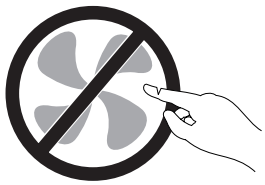
CAUTION

Do not attempt to service a product yourself unless instructed to do so by the Customer Support Center or your documentation. Only use a service provider who is approved to repair your particular product.

Note: Some computer parts can be upgraded or replaced by the customer. Upgrades typically are referred to as options. Replacement parts approved for customer installation are referred to as Customer Replaceable Units, or CRUs. Lenovo provides documentation with instructions when it is appropriate for customers to install options or replace CRUs. You must closely follow all instructions when installing or replacing parts. The Off state of a power indicator does not necessarily mean that voltage levels inside a product are zero. Before you remove the covers from a product equipped with an AC power cord, always make sure that the power is turned off and that the product is unplugged from any power source. For more information on CRUs, see ″Customer Replaceable Units (CRUs)″ in Service and Troubleshooting Guide that came with your computer. If you have any questions or concerns, contact the Customer Support Center.

Although there are no moving parts in your computer after the power cord has been disconnected, the following warnings are required for your safety.

DANGER



Hazardous moving parts. Keep fingers and other body parts away.

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CAUTION

Before replacing any CRUs, turn off the computer and wait three to five minutes to let the computer cool before opening the cover.

Power cords and power adapters

DANGER

Use only the power cords and power adapters supplied by the product manufacturer. The power cord and power adapter are intended for use with this product only. They should never be used with any other product.

The power cords shall be safety approved. For Germany, it shall be H05VV-F, 3G, 0.75 mm^2, or better. For other countries, the suitable types shall be used accordingly.

Never wrap a power cord around a power adapter or other object. Doing so can stress the cord in ways that can cause the cord to fray, crack, or crimp. This can present a safety hazard.

Always route power cords or any other cables so that they will not be walked on, tripped over, or pinched by objects.

Protect power cords and power adapters from liquids. For instance, do not leave your power cord or power adapter near sinks, tubs, toilets, or on floors that are cleaned with liquid cleansers. Liquids can cause a short circuit, particularly if the power cord or power adapter has been stressed by misuse. Liquids also can cause gradual corrosion of power cord terminals and/or the connector terminals on a power adapter, which can eventually result in overheating.

Always connect power cords and signal cables in the correct order and ensure that all power cord connectors are securely and completely plugged into receptacles.

Do not use any power adapter that shows corrosion at the ac input pins or shows signs of overheating (such as deformed plastic) at the ac input or anywhere on the power adapter.

Do not use any power cords where the electrical contacts on either end show signs of corrosion or overheating or where the power cord appears to have been damaged in any way.

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Extension cords and related devices

DANGER

Ensure that extension cords, surge protectors, uninterruptible power supplies, and power strips that you use are rated to handle the electrical requirements of the product. Never overload these devices. If power strips are used, the load should not exceed the power strip input rating. Consult an electrician for more information if you have questions about power loads, power requirements, and input ratings.

Plugs and outlets

DANGER

If a receptacle (power outlet) that you intend to use with your computer equipment appears to be damaged or corroded, do not use the outlet until it is replaced by a qualified electrician.

Do not bend or modify the plug. If the plug is damaged, contact the manufacturer to obtain a replacement.

Do not share an electrical outlet with other home or commercial appliances that draw large amounts of electricity; otherwise, unstable voltage might damage your computer, data, or attached devices.

Some products are equipped with a three-pronged plug. This plug fits only into a grounded electrical outlet. This is a safety feature. Do not defeat this safety feature by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact an electrician for an approved outlet adapter or to replace the outlet with one that enables this safety feature. Never overload an electrical outlet. The overall system load should not exceed 80 percent of the branch circuit rating. Consult an electrician for more information if you have questions about power loads and branch circuit ratings.

Be sure that the power outlet you are using is properly wired, easily accessible, and located close to the equipment. Do not fully extend power cords in a way that will stress the cords.

Be sure that the power outlet provides the correct voltage and current for the product you are installing.

Carefully connect and disconnect the equipment from the electrical outlet.

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Power supply statement

DANGER

Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

External devices

CAUTION

Do not connect or disconnect any external device cables other than USB and 1394 cables while the computer power is on; otherwise, you might damage your computer. To avoid possible damage to attached devices, wait at least five seconds after the computer is shut down to disconnect external devices.

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Batteries

DANGER

Personal computers manufactured by Lenovo contain a coin cell battery to provide power to the system clock. In addition, many mobile products, such as notebook computers, utilize a rechargeable battery pack to provide system power when in portable mode. Batteries supplied by Lenovo for use with your product have been tested for compatibility and should only be replaced with approved parts.

Never attempt to open or service any battery. Do not crush, puncture, or incinerate batteries or short circuit the metal contacts. Do not expose the battery to water or other liquids. Only recharge the battery pack strictly according to instructions included in the product documentation.

Battery abuse or mishandling can cause the battery to overheat, which can cause gasses or flame to "vent" from the battery pack or coin cell. If your battery is damaged, or if you notice any discharge from your battery or the buildup of foreign materials on the battery leads, stop using the battery and obtain a replacement from the battery manufacturer.

Batteries can degrade when they are left unused for long periods of time. For some rechargeable batteries (particularly Lithium Ion batteries), leaving a battery unused in a discharged state could increase the risk of a battery short circuit, which could shorten the life of the battery and can also pose a safety hazard. Do not let rechargeable Lithium-Ion batteries completely discharge or store these batteries in a discharged state.

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Rechargeable battery notice

DANGER

Do not attempt to disassemble or modify the battery pack. Attempting to do so can cause an explosion, or liquid leakage from the battery pack. A battery pack other than the one specified by Lenovo, or a disassembled or modified battery pack is not covered by the warranty.

If the rechargeable battery pack is incorrectly replaced, there is danger of an explosion. The battery pack contains a small amount of harmful substances. To avoid possible injury:

- **Replace only with a battery of the type recommended by Lenovo.**
- **Keep the battery pack away from fire.**
- **Do not expose it to water or rain.**
- **Do not attempt to disassemble it.**
- **Do not short-circuit it.**
- **Keep it away from children.**
- **Do not drop the battery pack.**

Do not put the battery pack in trash that is disposed of in landfills. When disposing of the battery, comply with local ordinances or regulations.

The battery pack should be stored at room temperature, charged to approximately 30 to 50% of capacity. We recommend that battery pack be charged about once per year to prevent overdischarge.

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Lithium coin cell battery notice

DANGER

Danger of explosion if battery is incorrectly replaced.

When replacing the lithium coin cell battery, use only the same or an equivalent type that is recommended by the manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

The following statement applies to users in the state of California, U.S.A.

California Perchlorate Information:

Products containing CR (manganese dioxide) lithium coin cell batteries may contain perchlorate.

Perchlorate Material — special handling may apply.
See http://www.dtsc.ca.gov/hazardouswaste/perchlorate.

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Heat and product ventilation

DANGER

Computers, AC adapters, and many accessories can generate heat when turned on and when batteries are charging. Notebook computers can generate a significant amount of heat due to their compact size. Always follow these basic precautions:

- **When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become hot. Avoid keeping your hands, your lap, or any other part of your body in contact with a hot section of the computer for any extended length of time. When you use the keyboard, avoid keeping your palms on the palm rest for a prolonged period of time. Your computer generates some heat during normal operation. The amount of heat depends on the amount of system activity and the battery charge level. Extended contact with your body, even through clothing, could cause discomfort or even a skin burn. Periodically take breaks from using the keyboard by lifting your hands from the palm rest; and be careful not to use the keyboard for any extended length of time.**
- **Do not operate your computer or charge the battery near flammable materials or in explosive environments.**
- **Ventilation slots, fans and/or heat sinks are provided with the product for safety, comfort, and reliable operation. These features might inadvertently become blocked by placing the product on a bed, sofa, carpet, or other flexible surface. Never block, cover, or disable these features.**
- **When the AC adapter is connected to an electrical outlet and your computer, it generates heat. Do not place the adapter in contact with any part of your body while using it. Never use the AC adapter to warm your body. Extended contact with your body, even through clothing, may cause a skin burn.**

For your safety, always follow these basic precautions with your computer:

- **Keep the cover closed whenever the computer is plugged in.**
- **Regularly inspect the outside of the computer for dust accumulation.**
- **Remove dust from vents and any perforations in the bezel. More frequent cleanings might be required for computers in dusty or high-traffic areas.**
- **Do not restrict or block any ventilation openings.**
- **Do not operate your computer inside furniture, as this might increase the risk of overheating.**
- **Airflow temperatures into the computer should not exceed 35° C (95° F).**

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CD and DVD drive safety

DANGER

CD and DVD drives spin discs at a high speed. If a CD or DVD is cracked or otherwise physically damaged, it is possible for the disc to break apart or even shatter when the CD drive is in use. To protect against possible injury due to this situation, and to reduce the risk of damage to your computer, do the following:

- **Always store CD/DVD discs in their original packaging.**
- **Always store CD/DVD discs out of direct sunlight and away from direct heat sources.**
- **Remove CD/DVD discs from the computer when not in use.**
- **Do not bend or flex CD/DVD discs, or force them into the computer or their packaging.**
- **Check CD/DVD discs for cracks before each use. Do not use cracked or damaged discs.**

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Electrical current safety information

DANGER

Electric current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not use your computer during a lightning storm.**
- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **Whenever possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, battery pack, and all the cables before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Do not use your computer until you have closed the cover. Never use the computer when the cover is open.**
- **Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.**

To connect:

1. **Turn everything OFF.**
2. **First, attach all cables to devices.**
3. **Attach signal cables to connectors.**
4. **Attach power cords to outlets.**
5. **Turn devices ON.**

To disconnect:

1. **Turn everything OFF.**
2. **First, remove power cords from outlets.**
3. **Remove signal cables from connectors.**
4. **Remove all cables from devices.**

The power cord must be disconnected from the wall outlet or receptacle before installing all other electrical cables connected to the ThinkPad® computer.

The power cord may be reconnected to the wall outlet or receptacle only after all other electrical cables have been connected to the computer.

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Modem safety information

DANGER

For North America Type:

CAUTION: To reduce the risk of fire, use only No. 26 AWG or larger (for example, No. 24 AWG) telecommunication line cord listed by Underwriters Laboratories (UL) or certified by the Canadian Standards Association (CSA).

To reduce the risk of fire, electrical shock, or injury when using telephone equipment, always follow basic safety precautions as the following:

- **Do not connect the cable to or disconnect it from the telephone outlet on the wall during a lightning storm.**
- **Do not install telephone jacks in wet locations. Do not use your computer near water.**
- **Do not touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.**
- **Use caution when installing or modifying telephone lines.**
- **Do not use your computer with the telephone cable connection during an electrical storm. There may be a remote risk of electric shock from lightning.**
- **Do not use a telephone (other than a cordless type) during an electrical storm.**
- **Do not use the telephone to report a gas leak in the vicinity of the leak.**
- **Do not connect the telephone cable to the Ethernet connector.**

Laser compliance statement

Some personal computer models are equipped from the factory with a CD or DVD drive. CD and DVD drives are also sold separately as options. CD and DVD drives are laser products. The drive's classification label (shown below) is on the surface of the drive.

CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL A LASER DE CLASSE 1
KLASS 1 LASER APPARAT

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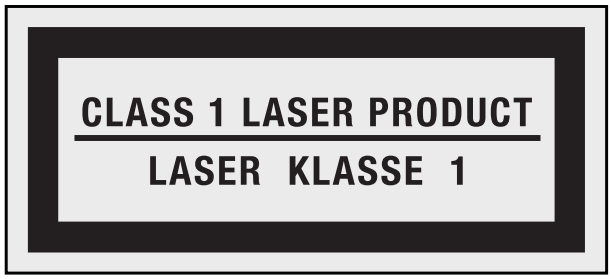

Example of the label

These drives are certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, these drives are certified to conform to the requirements of the International Electrotechnical Commission (IEC) 60825-1 and CENELEC EN 60825-1 for Class 1 laser products.

Class 1 laser products are not considered hazardous. The design of the laser system and the optical storage drive ensures that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing.

When a CD or DVD drive is installed, note the following handling instructions.

DANGER

Use of controls, adjustments, or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Do not remove the drive covers. Removing the covers of the CD or DVD drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD or DVD drive.

Some CD and DVD drives contain an embedded Class 3A or Class 3B laser diode. Note the following statement.

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DANGER

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Liquid crystal display (LCD) notice

CAUTION: For products with mercury-containing fluorescent lamps (i.e., non-LED)

The fluorescent lamp in the liquid crystal display contains mercury; dispose according to local, state, or federal laws.

The LCD is made of glass, and rough handling or dropping the computer can cause the LCD to break. If the LCD breaks and the internal fluid gets into your eyes or on your hands, immediately wash the affected areas with water for at least 15 minutes; if any symptoms are present after washing, get medical care.

Using headphones or earphones

If your computer has both a headphone connector and an audio-out connector, always use the headphone connector for headphones (also called a headset) or earphones.

Excessive sound pressure from earphones and headphones can cause hearing loss. Adjustment of the equalizer to maximum increases the earphones and headphones output voltage and therefore the sound pressure level.

Excessive use of headphones or earphones for a long period of time at high volume can be dangerous if the output of the headphones or earphone connectors do not comply with specifications of EN 50332-2. The headphone output connector of your computer complies with EN 50332-2 Sub clause 7. This specification limits the computer's maximum wide band true RMS output voltage to 150 mV. To help protect against hearing loss, ensure that the headphones or earphones you use also comply with EN 50332-2 (Clause 7

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limits) for a wide band characteristic voltage of 75 mV. Using headphones that do not comply with EN 50332-2 can be dangerous due to excessive sound pressure levels.

If your Lenovo computer came with headphones or earphones in the package, as a set, combination of the headphones or earphones and the computer already complies with the specifications of EN 50332-1. If different headphones or earphones are used, ensure that they comply with EN 50332-1 (Clause 6.5 Limitation Values). Using headphones that do not comply with EN 50332-1 can be dangerous due to excessive sound pressure levels.

Additional safety information

DANGER

Plastic bags can be dangerous. Keep plastic bags away from babies and children to avoid danger of suffocation.

Notice for Tablet PC users

Safety Notice for users in Australia:

DANGER

Do not connect phone line while using tablet mode.

Notice for users in the U.S.A.

Many PC products and accessories contain cords, cables or wires, such as power cords or cords to connect the accessory to a PC. If this product has such a cord, cable or wire, then the following warning applies:

WARNING

Handling the cord on this product or cords associated with accessories sold with this product will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

Save these instructions.

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Chapter 2. Operating environment and other important notices

Operating environment

The optimal environment in which to use your computer is 10°C-35°C (50°F-95°F) with humidity ranging between 35% and 80%. If your computer is stored or transported in temperatures less than 10°C (50°F), allow the cold computer to rise slowly to an optimal operating temperature of 10°C-35°C (50°F-95°F) before use. This process could take two hours in extreme conditions. Failure to allow your computer to rise to an optimal operating temperature before use could result in irreparable damage to your computer.

If possible, place your computer in a well-ventilated and dry area without direct exposure to sunshine.

Keep electrical appliances such as an electric fan, radio, high-powered speakers, air conditioner, and microwave oven away from your computer because the strong magnetic fields generated by these appliances can damage the monitor and data on the hard disk or solid state drive.

Do not place any beverages on top of or beside the computer or other attached devices. If liquid is spilled on or in the computer or an attached device, a short circuit or other damage might occur.

Do not eat or smoke over your keyboard. Particles that fall into your keyboard can cause damage.

Static electricity prevention

Static electricity, although harmless to you, can seriously damage computer components and options. Improper handling of static-sensitive parts can cause damage to the part. When you unpack an option or CRU, do not open the static-protective package containing the part until the instructions direct you to install it.

When you handle options or CRUs, or perform any work inside the computer, take the following precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters, memory modules, and other circuit boards by the edges. Never touch exposed circuitry.

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- Prevent others from touching components.
- When you install a static-sensitive option or CRU, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- Whenever possible, remove the static-sensitive part from the static-protective packaging and install the part without setting it down. When this is not possible, place the static-protective packaging on a smooth, level surface and place the part on it.
- Do not place the part on the computer cover or other metal surface.

Cleaning and maintenance

Keep your computer and workspace clean. Shut down the computer and then disconnect the power cord before cleaning the computer. Do not spray any liquid detergent directly on the computer or use any detergent containing flammable material to clean the computer. Spray the detergent on a soft cloth and then wipe the computer surfaces.

Data safety

Do not delete unknown files or change the name of files or directories that were not created by you; otherwise, your computer software might fail to work. Be aware that accessing network resources can leave your computer vulnerable to computer viruses, hackers, spyware, and other malicious activities that might damage your computer, software, or data. It is your responsibility to ensure that you have adequate protection in the form of firewalls, antivirus software, and anti-spyware software and keep this software up to date.

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Chapter 3. Warranty information

Lenovo Limited Warranty

L505-0010-01 04/2008

This Lenovo Limited Warranty applies only to Lenovo branded hardware products you purchased for your own use and not for resale. This Lenovo Limited Warranty is available in other languages at http://www.lenovo.com/warranty.

What this Warranty Covers

Lenovo warrants that each hardware product that you purchase is free from defects in materials and workmanship under normal use during the warranty period. The warranty period for the product starts on the original date of purchase specified on your sales receipt or invoice unless Lenovo informs you otherwise in writing. The warranty period and type of warranty service that apply to your product are designated below under the section titled "**Warranty information**."

THIS WARRANTY IS YOUR EXCLUSIVE WARRANTY AND REPLACES ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES APPLY ONLY TO THE EXTENT REQUIRED BY LAW AND ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION ON DURATION MAY NOT APPLY TO YOU.

How to Obtain Warranty Service

If the product does not function as warranted during the warranty period, you may obtain warranty service by contacting Lenovo or an approved service provider. Each of them is referred to as a "Service Provider." A list of Service Providers and their telephone numbers is available at http://www.lenovo.com/support/phone.

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Warranty service may not be available in all locations and may differ from location to location. Charges may apply outside a Service Provider's normal service area. Contact a local Service Provider for location-specific information.

What Your Service Provider Will Do to Correct Problems

When you contact a Service Provider, you must follow the problem determination and resolution procedures specified.

Your Service Provider will attempt to diagnose and resolve your problem over the telephone, e-mail, or through remote assistance. Your Service Provider may direct you to download and install designated software updates.

Some problems can be resolved with a replacement part that you can install yourself called a "Customer Replaceable Unit" or "CRU." If so, your Service Provider will ship the CRU to you for you to install.

If your problem cannot be resolved over the telephone or remotely, through your application of software updates or the installation of a CRU by you, your Service Provider will arrange for service under the type of warranty service designated for the product under the section titled "**Warranty information**."

If your Service Provider determines that it is unable to repair your product, your Service Provider will replace it with one that is at least functionally equivalent.

If your Service Provider determines that it is unable to either repair or replace your product, your sole remedy is to return the product to your place of purchase or to Lenovo for a refund of your purchase price.

Replacement of a Product or Part

When the warranty service involves the replacement of a product or part, the replaced product or part becomes Lenovo's property and the replacement product or part becomes your property. Only unaltered Lenovo products and parts are eligible for replacement. The replacement product or part provided by Lenovo may not be new, but it will be in good working order and at least functionally equivalent to the original product or part. The replacement product or part shall be warranted for the balance of the period remaining on the original product.

Before your Service Provider replaces a product or part, you agree to:

1. remove all features, parts, options, alterations, and attachments not under warranty service;

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2. ensure that the product or part is free of any legal obligations or restrictions that prevent its replacement; and
3. obtain authorization from the owner to have your Service Provider service a product or part if you do not own it.

Your Additional Responsibilities

Where applicable, before service is provided, you agree to:
1. follow the service request procedures that your Service Provider specifies;
2. backup or secure all programs and data contained in the product;
3. provide your Service Provider with all system keys or passwords and sufficient, free, and safe access to your facilities to perform service; and
4. ensure that all information about identified or identifiable individuals (″Personal Data″) is deleted from the product or that, with respect to any Personal Data that you did not delete, you are in compliance with all applicable laws.

Use of Personal Information

If you obtain service under this warranty, Lenovo will store, use, and process information about your warranty service and your contact information, including name, phone numbers, address, and e-mail address. Lenovo will use this information to perform service under this warranty and to improve our business relationship with you. We may contact you to inquire about your satisfaction regarding our warranty service or to notify you about any product recalls or safety issues. In accomplishing these purposes, we may transfer your information to any country where we do business and may provide it to entities acting on our behalf. We may also disclose it where required by law.

What this Warranty Does not Cover

This warranty does not cover the following:
- uninterrupted or error-free operation of a product;
- loss of, or damage to, your data;
- any software programs, whether provided with the product or installed subsequently;
- failure or damage resulting from misuse, accident, modification, unsuitable physical or operating environment, natural disasters, power surges, or improper maintenance by you;
- damage caused by a non-authorized service provider;
- failure of, or damage caused by, any third party products, including those that Lenovo may provide or integrate into the Lenovo product at your request; and
- any technical or other support, such as assistance with ″how-to″ questions and those regarding product set-up and installation.

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This warranty is voided by removal or alteration of identification labels on the product or its parts.

Limitation of Liability

Lenovo is responsible for loss or damage to your product only while it is: 1) in your Service Provider's possession; or 2) in transit in those cases where the Service Provider is responsible for the transportation.

Neither Lenovo nor your Service Provider is responsible for any of your data including confidential, proprietary, or personal data contained in a product. You should remove and/or backup all such information from the product prior to its service or return.

Circumstances may arise where, because of a default on Lenovo's part or other liability, you may be entitled to recover damages from Lenovo. In each such instance, regardless of the basis of your claim against Lenovo (including breach, negligence, misrepresentation, or other contract or tort claim), except and to the extent that liability cannot be waived or limited by applicable laws, Lenovo shall not be liable for more than the amount of actual direct damages suffered by you, up to the amount you paid for the product. This limit does not apply to damages for bodily injury (including death) and damage to real property or tangible personal property for which Lenovo is liable under law.

This limit also applies to Lenovo's suppliers, resellers, and your Service Provider. It is the maximum amount for which Lenovo, its suppliers, resellers, and your Service Provider are collectively responsible.

UNDER NO CIRCUMSTANCES SHALL LENOVO, ITS SUPPLIERS, RESELLERS, OR SERVICE PROVIDERS BE LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES; 2) LOSS OR DAMAGE TO YOUR DATA; OR 3) SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, BUSINESS REVENUE, GOODWILL OR ANTICIPATED SAVINGS. AS SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Dispute Resolution

If you acquired the product in **Cambodia, Indonesia, Philippines, Vietnam or Sri Lanka**, disputes arising out of or in connection with this warranty shall be finally settled by arbitration held in Singapore and this warranty shall be governed, construed and enforced in accordance with the laws of Singapore, without regard to conflict of laws. If you acquired the product in **India**,

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disputes arising out of or in connection with this warranty shall be finally settled by arbitration held in Bangalore, India. Arbitration in Singapore shall be held in accordance with the Arbitration Rules of Singapore International Arbitration Center ("SIAC Rules") then in effect. Arbitration in India shall be held in accordance with the laws of India then in effect. The arbitration award shall be final and binding on the parties without appeal. Any award shall be in writing and set forth the findings of fact and the conclusions of law. All arbitration proceedings, including all documents presented in such proceedings, shall be conducted in the English language, and the English language version of this warranty prevails over any other language version in such proceedings.

Other Rights

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR JURISDICTION TO JURISDICTION. YOU MAY ALSO HAVE OTHER RIGHTS UNDER APPLICABLE LAW OR WRITTEN AGREEMENT WITH LENOVO. NOTHING IN THIS WARRANTY AFFECTS STATUTORY RIGHTS, INCLUDING RIGHTS OF CONSUMERS UNDER NATIONAL LEGISLATION GOVERNING THE SALE OF CONSUMER GOODS THAT CANNOT BE WAIVED OR LIMITED BY CONTRACT.

European Economic Area (EEA)

Customers in the EEA may contact Lenovo at the following address: EMEA Service Organisation, Lenovo (International) B.V., Floor 2, Einsteinova 21, 851 01, Bratislava, Slovakia. Service under this warranty for Lenovo hardware products purchased in EEA countries may be obtained in any EEA country in which the product has been announced and made available by Lenovo.

Warranty Information

The warranty period may vary by country or region and is specified in Appendix A of the Service and Troubleshooting Guide that came with your computer.

If required, your Service Provider will provide repair or exchange service depending on the type of warranty service specified for your product and the available service. Scheduling of service will depend upon the time of your call, parts availability, and other factors.

A warranty period of three (3) years on parts and one (1) year on labor means that Lenovo will provide warranty service without charge for:

a. parts and labor during the first year of the warranty period (or a longer period as required by law); and

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b. parts only, on an exchange basis, in the second and third years of the warranty period. Your Service Provider will charge you for any labor provided in performance of the repair or replacement in the second and third years of the warranty period.

Types of Warranty Service

1. Customer Replaceable Unit ("CRU") Service

Under CRU Service, your Service Provider will ship CRUs to you for installation by you. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request. CRUs that are easily installed by you are called Self-service CRUs, while Optional-service CRUs may require some technical skill and tools. Installation of Self-service CRUs is your responsibility. You may request that a Service Provider install Optional-service CRUs under one of the other types of warranty service designated for your product. An optional service offering may be available for purchase from Lenovo to have Lenovo install Self-service CRUs for you. You may find a list of CRUs and their designation in the publication that ships with your product or at http://www.lenovo.com/CRUs. The requirement to return a defective CRU, if any, will be specified in the materials shipped with a replacement CRU. When return is required: 1) return instructions, a prepaid return shipping label, and a container will be included with the replacement CRU; and 2) you may be charged for the replacement CRU if your Service Provider does not receive the defective CRU within thirty (30) days of your receipt of the replacement.

2. On-site Service

Under On-Site Service, your Service Provider will either repair or exchange the product at your location. You must provide a suitable working area to allow disassembly and reassembly of the Lenovo product. For some products, certain repairs may require your Service Provider to send the product to a designated service center.

3. Courier or Depot Service

Under Courier or Depot Service, your product will be repaired or exchanged at a designated service center, with shipping arranged by your Service Provider. You are responsible for disconnecting the product. A shipping container will be provided to you for you to return your product to a designated service center. A courier will pick up your product and deliver it to the designated service center. Following its repair or exchange, the service center will arrange the return delivery of the product to you.

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4. Customer Carry-In or Mail-In Service

Under Customer Carry-In or Mail-In Service, your product will be repaired or exchanged at a designated service center, with delivery or shipping arranged by you. You are responsible to deliver or mail, as your Service Provider specifies, (prepaid by you unless specified otherwise) the product, suitably packaged to a designated location. After the product has been repaired or exchanged, it will be made available for your collection. Failure to collect the product may result in your Service Provider disposing of the product as it sees fit. For Mail-in Service, the product will be returned to you at Lenovo's expense, unless your Service Provider specifies otherwise.

5. Product Exchange Service

Under Product Exchange Service, Lenovo will ship a replacement product to your location. You are responsible for its installation and verification of its operation. The replacement product becomes your property in exchange for the failed product, which becomes the property of Lenovo. You must pack the failed product in the shipping carton used to ship the replacement product and return it to Lenovo. Transportation charges, both ways, are paid by Lenovo. Failure to use the carton in which the replacement product was received may result in your responsibility for damage to the failed product during shipment. You may be charged for the replacement product if Lenovo does not receive the failed product within thirty (30) days of your receipt of the replacement product.

Suplemento de Garantía para México

Este Suplemento se considera parte integrante de la Garantía Limitada de Lenovo y será efectivo única y exclusivamente para los productos distribuidos y comercializados dentro del Territorio de los Estados Unidos Mexicanos. En caso de conflicto, se aplicarán los términos de este Suplemento.

Todos los programas de software precargados en el equipo sólo tendrán una garantía de treinta (30) días por defectos de instalación desde la fecha de compra. Lenovo no es responsable de la información incluida en dichos programas de software y/o cualquier programa de software adicional instalado por Usted o instalado después de la compra del producto.

Los servicios no cubiertos por la garantía se cargarán al usuario final, previa obtención de una autorización.

En el caso de que se precise una reparación cubierta por la garantía, por favor, llame al Centro de soporte al cliente al 001-866-434-2080, donde le dirigirán al Centro de servicio autorizado más cercano. Si no existiese ningún Centro de servicio autorizado en su ciudad, población o en un radio de 70 kilómetros de

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su ciudad o población, la garantía incluirá cualquier gasto de entrega razonable relacionado con el transporte del producto a su Centro de servicio autorizado más cercano. Por favor, llame al Centro de servicio autorizado más cercano para obtener las aprobaciones necesarias o la información relacionada con el envío del producto y la dirección de envío.

Para obtener una lista de los Centros de servicio autorizados, por favor, visite::

http://www.lenovo.com/mx/es/servicios

Manufactured by one of the following, depending on the model:
SCI Systems de México, S.A. de C.V.
Av. De la Solidaridad Iberoamericana No. 7020
Col. Club de Golf Atlas
El Salto, Jalisco, México
C.P. 45680
Tel. 01-800-3676900

China (IIPC)
Shenzhen, China (two plants)
ISH2 Building, No. 3 Guanglan Road and Shuncang Building,
No. 6 Guanglan Road
Futian Free Trade Zone,
Shenzhen, P.R. China 518038

Wistron Infocomm (Kunshan) Co., Ltd.
No. 168, First Avenue,
Kunshan Export Processing Zone
Kunshan, Jiangsu, China
Tel. +86-512-57367888

Pegatron Corporation
No. 3768, Xiu Yan Rd. Kang Qiao Town, Nan Hui Dist,
Shanghai, China
Tel: +86.21.3811.8888

Marketed by:
Lenovo Mexico S de RL de CV
Av. Santa Fe 505, Piso 15
Col. Cruz Manca
Cuajimalpa, México, DF
CP 05349
Tel: 55-5000-8500

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ThinkPad

Part Number: 44C9741

Printed in China

(1P) P/N: 44C9741

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Lenovo BIOS Windows Management Instrumentation Interface Deployment Guide

Date: August 2008

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First Edition (August 2008)

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Contents

Preface v

Chapter 1. Overview 1
Using Windows Management Instrumentation . . . 1
Key benefits 1
Functions 2
Environment 2
Interface 2
Supported computers 2

Chapter 2. Script classes and parameters 3
Configuring BIOS settings 3
Return types 3
Password Authentication 4
Available BIOS setting names 4

Chapter 3. Typical usage 9
Listing current BIOS settings 9
Changing BIOS settings. 9
Changing the boot order 9
Restoring default settings. 10
Changing an existing hardware password 10
Limitations 10

Chapter 4. Security 11

Appendix A. Sample Visual Basic scripts for configuring BIOS settings . 13
Restore default settings 13
List all BIOS settings on the local computer . . . 13
Set a single BIOS setting on the local computer . . 14
Set a single BIOS setting on the local computer if a supervisor password exists 15
List all BIOS settings on the remote computer . . . 15
Set a single BIOS setting on a remote computer . . 16
Set a single BIOS setting on a remote computer when a supervisor password exists 17
Set a supervisor password on the local computer when a supervisor password exists 18
Set a supervisor password on a remote computer when a supervisor password exists 18

Appendix B. Sample PowerShell scripts for remote BIOS management 21
Get all current BIOS settings. 21
Show a particular BIOS setting 22
Setting a BIOS setting 23

Appendix C. Notices 25
Trademarks 26

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Preface

The purpose of this guide is to explain how to modify BIOS passwords, settings, and boot order using Windows Management Instrumentation (WMI) through the Lenovo client-management interface. This guide is intended for skilled IT administrators who are familiar with configuring BIOS settings on computers in their organizations.

This guide is provided in a ZIP file package that contains this deployment guide as well as Visual Basic sample scripts to use when configuring BIOS settings.

This deployment guide is developed for IT professionals to assist with the unique challenges that they encounter. If you have suggestions or comments, communicate with your Lenovo® authorized representative. To learn more about the technologies that can help you lower the total cost of ownership and to check for periodic updates to this guide, visit the following Web site:

`www.lenovo.com/support`

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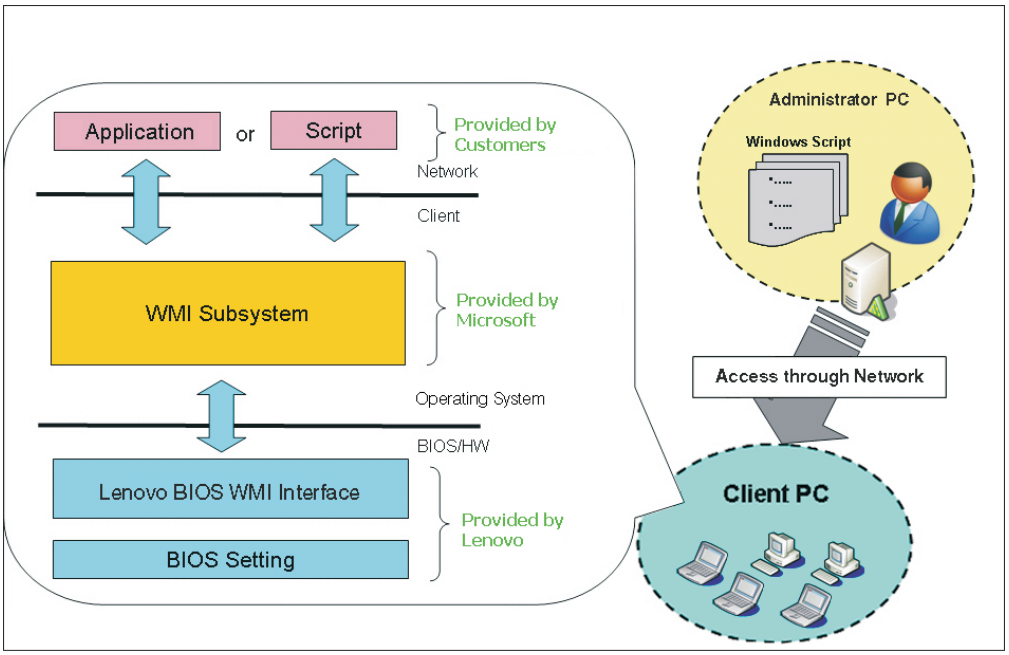
Chapter 1. Overview

IT administrators are always looking for easier ways to manage client computer BIOS settings, which include passwords, hardware settings, and the boot order. The Lenovo BIOS WMI interface provides a simplified way to change these settings. Lenovo has developed a BIOS interface that can be manipulated through Windows Management Instrumentation (WMI). The Lenovo BIOS WMI interface enables IT administrators to make queries on current BIOS settings, restore settings to their factory defaults, change single settings, reset or change passwords, and modify the boot order either at client computers or remotely.

Using Windows Management Instrumentation

WMI is provided as a standard feature in most Windows® operating systems. It provides a powerful set of functions, such as query-based information retrieval and event notification, which enables users to manage both local and remote computers. The Lenovo BIOS WMI interface extends the capabilities of WMI to allow management of BIOS settings.

The following illustration shows how WMI can be used to access Lenovo BIOS settings.



WMI uses Windows Script host (WSH) to interpret scripts. You can write your scripts in either Windows Visual Basic Scripting Edition (VBScript) or JavaScript.

Key benefits

The Lenovo BIOS WMI interface provides the following benefits:

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Functions

- Flexible BIOS configuration, including the ability to change a single BIOS setting or all BIOS settings
- BIOS password management, including updating supervisor passwords, power-on passwords, and hard disk drive (HDD) passwords
- No dependency on a specific BIOS level

Environment

- Remote or local capabilities
- Support of unattended operations
- No software installation, including managed object format (MOF), required
- Replaces DOS-based BIOS configuration tools

Interface

- Easy to adopt for various management servers
- Replaces current SMI interface
- Common interface for different products

Supported computers

BIOS setup through WMI is supported on the following new ThinkPad products only:

- R400
- R500
- T500
- W500
- X200
- X200s
- X200 Tablet
- X301

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Chapter 2. Script classes and parameters

This chapter contains WMI implementation details for configuring BIOS settings.

Configuring BIOS settings

The following interface details can be used to access Lenovo BIOS settings.

- Namespace: "\root\WMI"
- Base Class: "Lenovo_BIOSElement"
- Interface details (see Table 1)

Table 1. Interface Details

Class Name	Type	Parameter / Return	Example
Lenovo_BiosSetting	Query	CurrentSetting: "Item,Value"	"WakeOnLAN,Enable"
Lenovo_SetBiosSetting	Method	"Item,Value,Password,Encoding, KbdLang;"	"WakeOnLAN,Disable,pswd, ascii,us;"
Lenovo_SaveBios Settings	Method	"Password,Encoding,KbdLang;"	"pswd,ascii,us;"
Lenovo_DiscardBios Settings	Method	"Password,Encoding,KbdLang;"	"pswd,ascii,us;"
Lenovo_LoadDefault Settings	Method	"Password,Encoding,KbdLang;"	"pswd,ascii,us;"
Lenovo_SetBios Password	Method	"PasswordType,CurrentPassword, NewPassword, Encoding,KbdLang;"	"pop,oldpop,newpop,ascii,us;"

Notes:

1. See Appendix A, "Sample Visual Basic scripts for configuring BIOS settings," on page 13 for Visual Basic sample scripts.
2. See Appendix B, "Sample PowerShell scripts for remote BIOS management," on page 21 for PowerShell sample scripts.
3. See Table 4 on page 4 for a listing of acceptable setting names.

Return types

You will receive one of the following return types after making changes to BIOS settings:

Table 2. Return Types

Return Type	Description
Success	Operation completed successfully.
Not Supported	The feature is not supported on this system.
Invalid Parameter	The item or value provided is not valid.
Access Denied	The change could not be made due to an authentication problem. If a supervisor password exists, the correct supervisor password must be provided.

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Table 2. Return Types (continued)

Return Type	Description
System Busy	BIOS changes have already been made that need to be committed. Reboot the system and try again

Password Authentication

If a supervisor password is already set, you must specify that supervisor password before you can change any BIOS settings.

The format for password parameters is "abc,ascii,us" with descriptions in Table 3.

Table 3. Password parameters format, password authentication

Parameter	Description	Possible selections
Parameter 1	Current password	• “abc” - raw ascii character • “1e302e” - scancode
Parameter 2	Password encoding	• “ascii” • “scancode”
Parameter 3	Keyboard languages (valid only if encoding is ″ascii″)	• ″us″ - English US, English UK, Chinese-Traditional, Danish, Dutch, French-Canadian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Spanish-European, Spanish-Latin American, Swiss, Turkish • ″fr″ - French-European, Belgian • ″gr″ - German, Czech, Slovak, Slovenian

Available BIOS setting names

Some BIOS settings are dependent on the presence of certain hardware features. Settings might vary on different computers.

Notes:

1. BIOS settings and values are case sensitive.
2. The security-related options are not changed even if the “load default” is requested.

Table 4. List of available BIOS settings

Item name	Selection name	Load default?
WakeOnLAN	“Enable”, ”Disable”	N
FlashOverLAN	“Enable”, ”Disable”	N
EthernetLANOptionROM	“Enable”, ”Disable”	N
HarddriveDMA	“Enable”, ”Disable”	N
WirelessLANAndWiMAXRadios	“Enable”, ”Disable”	Y
SerialPort	“Enable”, ”Disable”	Y
SerialPortIO	“3F8”, “2F8”, “3E8”, “2E8”	Y
SerialPortIRQ	“3”, “4”, “5”, “7”	Y
ParallelPort	“Enable”, ”Disable”	Y

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Table 4. List of available BIOS settings (continued)

Item name	Selection name	Load default?
ParallelPortMode	"OutputOnly","BiDirectional", "ECP"	Y
ParallelPortIO	"378", "278", "3BC"	Y
ParallelPortIRQ	"5", "7"	Y
ParallelPortDMA	"0", "1", "3"	Y
PCIINTA	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTB	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTC	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTD	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTE	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTF	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTG	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
PCIINTH	"Disable", "Auto Select", "3", "4", "5", "6", "7", "9", "10", "11"	Y
USBBIOSSupport	"Enable", "Disable"	Y
AlwaysOnUSB	"Enable", "Disable"	Y
TrackPoint	"Disable", "Automatic"	Y
TouchPad	"Disable", "Automatic"	Y
FnKeyLock	"Enable", "Disable"	Y
ThinkPadNumLock	"Independent", "Synchronized"	Y
PowerOnNumLock	"Auto", "On", "Off"	Y
PrimaryVideo	"PCIExpress", "Internal"	Y
BootDisplayDevice	"LCD", "VGA", "DisplayPort", "DVI"	Y
GraphicsDevice	"IntegratedGfx","DiscreteGfx", "SwitchableGfx"	Y
OsDetectionForSwitchableGraphics	Enable", "Disable	Y
TimerWakeWithBattery	"Enable", "Disable"	Y
SpeedStep	"Enable", "Disable"	Y
SpeedStepModeAC	"MaximumPerformance", "BatteryOptimized", "MaximumBattery", "Automatic"	Y
SpeedStepModeBattery	"MaximumPerformance", "BatteryOptimized", "MaximumBattery", "Automatic"	Y
AdaptiveThermalManagementAC	"MaximizePerformance", "Balanced"	Y
AdaptiveThermalManagementBattery	"MaximizePerformance", "Balanced"	Y
CDRomSpeed	"High", "Normal", "Silent"	Y
CPUPowerManagement	"Disable", "Automatic"	Y

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Table 4. List of available BIOS settings (continued)

Item name	Selection name	Load default?
PCIPowerManagement	“Disable”, ”Automatic”	Y
PowerControlBeep	“Enable”, ”Disable”	Y
LowBatteryAlarm	“Enable”, ”Disable”	Y
PasswordBeep	“Enable”, ”Disable”	Y
KeyboardBeep	“Enable”, ”Disable”	Y
ExtendedMemoryTest	“Enable”, ”Disable”	Y
SATAControllerMode	“Compatibility”, “AHCI”, “RAID”	Y
CoreMultiProcessing	“Enable”, ”Disable”	N
VirtualizationTechnology	“Enable”, ”Disable”	N
VTdFeature	“Enable”, ”Disable”	N
IntelAMTControl	“Enable”, “Disable”	N
LegacyDevicesOnMiniDock	“Enable”, “Disable”	N
Passphrase	“Enable”, ”Disable”	N
LockBIOSSetting	“Enable”, ”Disable”	N
MinimumPasswordLength	“Disable”, “4”, “5”, “6”, “7”, “8”, “9”, “10”, “11”, “12”	N
BIOSPasswordAtUnattendedBoot	“Enable”, ”Disable”	N
PasswordResetService	“Enable”, ”Disable”	N
FingerprintPredesktopAuthentication	“Enable”, ”Disable”	N
FingerprintReaderPriority	“External”, “InternalOnly”	N
FingerprintSecurityMode	“Normal”, “High”	N
FingerprintPasswordAuthentication	“Enable”, ”Disable”	N
SecurityChip	“Active”, “Inactive”, “Disable”	N
TXTFeature	“Enable”, ”Disable”	N
BIOSUpdateByEndUsers	“Enable”, ”Disable”	N
DataExecutionPrevention	“Enable”, ”Disable”	N
EthernetLANAccess	“Enable”, ”Disable”	N
WirelessLANAccess	“Enable”, ”Disable”	N
WiMAXAccess	“Enable”, ”Disable”	N
WirelessWANAccess	“Enable”, ”Disable”	N
BluetoothAccess	“Enable”, ”Disable”	N
WirelessUSBAccess	“Enable”, ”Disable”	N
ModemAccess	“Enable”, ”Disable”	N
USBPartAccess	“Enable”, ”Disable”	N
IEEE1394Access	“Enable”, ”Disable”	N
SerialPortAccess	“Enable”, ”Disable”	N
ParallelPortAccess	“Enable”, ”Disable”	N
CardBusSlotAccess	“Enable”, ”Disable”	N
ExpressCardAccess	“Enable”, ”Disable”	N
PCIExpressSlotAccess	“Enable”, ”Disable”	N

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Table 4. List of available BIOS settings (continued)

Item name	Selection name	Load default?
UltrabayAccess	“Enable”, ”Disable”	N
MemoryCardSlotAccess	“Enable”, ”Disable”	N
SmartCardSlotAccess	“Enable”, ”Disable”	N
IntegratedCameraAccess	“Enable”, ”Disable”	N
MicrophoneAccess	“Enable”, ”Disable”	N
FingerprintReaderAccess	“Enable”, ”Disable”	N
ComputraceModuleActivation	“Enable”, ”Disable”	N
BootMode	“Quick”, “Diagnostics”	Y
StartupOptionKeys	“Enable”, ”Disable”	Y
BootDeviceListF12Option	“Enable”, ”Disable”	N
BootOrder	“HDD0”, ”HDD1”, ”HDD2”, ”PCILAN”, ”ATAPICD0”, ”ATAPICD1”, ”USBFDD”, ”USBCD”, ”USBHDD”, ”NODEV”	Y
NetworkBootOrder	“HDD0”, ”HDD1”, ”HDD2”, ”PCILAN”, ”ATAPICD0”, ”ATAPICD1”, ”USBFDD”, ”USBCD”, ”USBHDD”, ”NODEV”	Y

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Chapter 3. Typical usage

Through WMI, you can configure BIOS settings in the following ways:

- List BIOS settings
- Change BIOS settings
- Change the boot order (sometimes referred to as the startup sequence)
- Load default BIOS settings

Listing current BIOS settings

For a list of all available BIOS settings that can be changed through WMI on a specific computer, use the Lenovo_BiosSetting class (see "List all BIOS settings on the local computer" on page 13 and "List all BIOS settings on the remote computer" on page 15 for sample scripts).

See Table 4 on page 4 for a list of available BIOS settings.

Changing BIOS settings

To change a BIOS setting, complete the following steps:

1. Identify the BIOS setting you want to change using the Lenovo_BiosSetting class (see "List all BIOS settings on the local computer" on page 13 and "List all BIOS settings on the remote computer" on page 15 for sample scripts).
2. Identify the value to which the setting will be changed.

   Note: See Table 4 on page 4 for a list of available values for a particular setting.
3. Change the BIOS setting to the desired value using the Lenovo_SetBiosSetting class, then use the Lenovo_SaveBiosSetting class to save the settings (see "Set a single BIOS setting on the local computer" on page 14 and"Set a single BIOS setting on a remote computer" on page 16 for sample scripts).

   Note: BIOS settings and values are case sensitive.

After making changes to the BIOS settings, you must reboot the computer before the changes will take effect.

Changing the boot order

To change the boot order, complete the following steps:

1. Determine the current setting for "BootOrder" by using the Lenovo_BiosSetting class (see "List all BIOS settings on the local computer" on page 13 and "List all BIOS settings on the remote computer" on page 15 for sample scripts).
2. To set a new boot order, use the Lenovo_SetBiosSetting class, then use the Lenovo_SaveBiosSetting class to save the settings (see "Set a single BIOS setting on the local computer" on page 14 and"Set a single BIOS setting on a remote computer" on page 16 for sample scripts). Specify a new boot order by listing the boot devices in order, separated by colons. Devices that are not specified are excluded from the boot order. In the following example, the CD drive 0 is the first boot device and hard disk drive 0 is the second startup device.

   ```
   ATAPICD0:HDD0
   ```

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Restoring default settings

To restore default BIOS settings, use the Lenovo_LoadDefaultSettings class, then use the Lenovo_SaveBiosSettings class to save the BIOS changes (see sample scripts).

Changing an existing hardware password

To update a password, specify a password type and format the password. The format for password parameters is ″pop,abc,def,ascii,us″ with descriptions in Table 5 (see “Set a supervisor password on the local computer when a supervisor password exists” on page 18 and “Set a supervisor password on a remote computer when a supervisor password exists” on page 18 for sample scripts).

Table 5. Password parameters format, changing existing hardware password

Parameter	Description	Possible selections
Parameter 1	Password type string	• “pap": Supervisor • “POP": Power-on • "uhdp1": User HDP 1 • "mhdp1": Master HDP 1 • "uhdp2": User HDP 2 • "mhdp2": Master HDP 2 • "uhdp3": User HDP 3 • "mhdp3": Master HDP 3
Parameter 2	Current password string	• “abc” - raw ascii character • “1e302e” - scancode
Parameter 3	New password string	• Raw ascii ″def″ • Scan code ″201221″
Parameter 4	Password encoding	• “ascii” • “scancode”
Parameter 5	Keyboard languages	• ″us″ - English US, English UK, Chinese-Traditional, Danish, Dutch, French-Canadian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Spanish-European, Spanish-Latin American, Swiss, Turkish • ″fr″ - French-European, Belgian • ″gr″ - German, Czech, Slovak, Slovenian

Limitations

The following WMI limitations exist for BIOS setup:

- BIOS settings cannot be changed at the same boot as power-on passwords (POP) and hard disk passwords (HDP). If you want to change BIOS settings and POP or HDP, you must reboot the system after changing one of them.
- A password cannot be set using this method when one does not already exist. Passwords can only be updated or cleared.

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Chapter 4. Security

WMI-based administration scripts operating over a remote connection send data over the network in clear text by default. You can enhance security by modifying WMI-based administration scripts to establish an encrypted remote connection as follows:

1. Set an impersonation level of ″impersonate″
2. Set an authentication level of ″pktPrivacy″

See Appendix A, “Sample Visual Basic scripts for configuring BIOS settings,” on page 13 for sample scripts used to implement WMI-based administration scripts that include these parameters for encryption.

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Appendix A. Sample Visual Basic scripts for configuring BIOS settings

The Visual Basic command line scripts in the ZIP file are examples that you may find helpful when configuring BIOS settings.

The scripts in the ZIP file can be used as-is on Windows XP or Windows Vista to modify BIOS settings on your Lenovo computer. The scripts can be executed on a command prompt using the cscript.exe utility. On Windows Vista, you must run the scripts from an administrator command prompt.

Note: The scripts in this appendix are for reference only. To copy and paste scripts, use the scripts in the ZIP file.

Restore default settings

Use the example scripts in the ZIP file as templates to restore default settings on the local computer.

Syntax: `cscript.exe LoadDefaults.vbs`
Example: `cscript.exe LoadDefaults.vbs`

```
'
' Load default BIOS settings
'
On Error Resume Next
Dim colItems

strComputer = "LOCALHOST"     ' Change as needed.
Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate}!\\" & strComputer & "\root\wmi")

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_LoadDefaultSettings")

strReturn = "error"
For Each objItem in colItems
    ObjItem.LoadDefaultSettings ";", strReturn
Next

WScript.Echo " LoadDefaultSettings: " + strReturn

If strReturn <> "Success" Then
    WScript.Quit
End If

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SaveBiosSettings")

strReturn = "error"
For Each objItem in colItems
    ObjItem.SaveBiosSettings ";", strReturn
Next

WScript.Echo " SaveBiosSettings: " + strReturn
```

List all BIOS settings on the local computer

Use the sample scripts in the ZIP file as templates to list all BIOS settings and values on the local computer.

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Syntax: cscript.exe ListAll.vbs
Example: cscript.exe ListAll.vbs

```
'
' List all BIOS settings
'
On Error Resume Next
Dim colItems

strComputer = "LOCALHOST"     ' Change as needed.
Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate}!\\" & strComputer & "\root\wmi")
Set colItems = objWMIService.ExecQuery("Select * from Lenovo_BiosSetting")

For Each objItem in colItems
    If Len(objItem.CurrentSetting) > 0 Then
        Setting = ObjItem.CurrentSetting
        StrItem = Left(ObjItem.CurrentSetting, InStr(ObjItem.CurrentSetting, ",")
 - 1)
        StrValue = Mid(ObjItem.CurrentSetting, InStr(ObjItem.CurrentSetting, ",")
 + 1, 256)
        WScript.Echo StrItem + " = " + StrValue
    End If
Next
```

Set a single BIOS setting on the local computer

Use the sample scripts in the ZIP file as templates to set a single BIOS setting on the local computer.

Syntax: cscript.exe SetConfig.vbs [Item] [Value]
Example: cscript.exe SetConfig.vbs WakeOnLAN Disable

```
'
' Set specific BIOS Setting
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 2 Then
    WScript.Echo "SetConfig.vbs [setting] [value]"
    WScript.Quit
End If

strRequest = WScript.Arguments(0) + "," + WScript.Arguments(1) + ";"

strComputer = "LOCALHOST"     ' Change as needed.
Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate}!\\" & strComputer & "\root\wmi")
Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SetBiosSetting")

For Each objItem in colItems
    ObjItem.SetBiosSetting strRequest, strReturn
Next

WScript.Echo strRequest
WScript.Echo " SetBiosSetting: " + strReturn

If strReturn <> "Success" Then
    WScript.Quit
End If

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SaveBiosSettings")
```


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```
strReturn = "error"
For Each objItem in colItems
    ObjItem.SaveBiosSettings ";", strReturn
Next

WScript.Echo strRequest
WScript.Echo " SaveBiosSettings: " + strReturn
```

Set a single BIOS setting on the local computer if a supervisor password exists

Use the sample scripts in the ZIP file as templates to set a single BIOS setting on the local computer if a supervisor password exists.

Syntax: `cscript.exe SetConfigPassword.vbs [Item] [Value] [Password + Encoding]`
Example: `cscript.exe SetConfigPassword.vbs WakeOnLAN Disable pass,ascii,us`

```
'
' Set specific BIOS Setting
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 3 Then
    WScript.Echo "SetConfigPassword.vbs [setting] [value] [password + encoding]"
    WScript.Quit
End If

strRequest = WScript.Arguments(0) + "," + WScript.Arguments(1) + "," +
 WScript.Arguments(2) + ";"

strComputer = "LOCALHOST"     ' Change as needed.
Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate}!\\" & strComputer & "\root\wmi")
Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SetBiosSetting")

For Each objItem in colItems
    ObjItem.SetBiosSetting strRequest, strReturn
Next

WScript.Echo strRequest
WScript.Echo " SetBiosSetting: " + strReturn

If strReturn <> "Success" Then
    WScript.Quit
End If

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SaveBiosSettings")

strReturn = "error"
For Each objItem in colItems
    ObjItem.SaveBiosSettings WScript.Arguments(2) + ";", strReturn
Next

WScript.Echo strRequest
WScript.Echo " SaveBiosSettings: " + strReturn
```

List all BIOS settings on the remote computer

Use the sample scripts in the ZIP file as templates to list all BIOS settings and values on a remote computer.

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Syntax: cscript.exe ListAllRemote.vbs [Hostname]
Example: cscript.exe ListAllRemote.vbs mattdev-c5

```
'
' List all BIOS settings
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 1 Then
   WScript.Echo "ListAllRemote.vbs [hostname]"
   WScript.Quit
End If

strComputer = WScript.Arguments(0)

Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate," _
    &"authenticationLevel=pktPrivacy}!\\" _
    & strComputer & "\root\wmi")

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_BiosSetting")

For Each objItem in colItems
    If Len(objItem.CurrentSetting) > 0 Then
        Setting = ObjItem.CurrentSetting
        StrItem = Left(ObjItem.CurrentSetting, InStr(ObjItem.CurrentSetting, ",")
 - 1)
        StrValue = Mid(ObjItem.CurrentSetting, InStr(ObjItem.CurrentSetting, ",")
 + 1, 256)
        WScript.Echo StrItem + " = " + StrValue
    End If
Next
```

Set a single BIOS setting on a remote computer

Use the sample scripts in the ZIP file as templates to set a single BIOS setting on a remote computer.

Syntax: cscript.exe SetConfigRemote.vbs [Item] [Value] [Hostname]
Example: cscript.exe SetConfigRemote.vbs WakeOnLAN Disable mattdev-c5

```
'
' Set specific BIOS Setting
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 3 Then
    WScript.Echo "SetConfigRemote.vbs [setting] [value] [hostname]"
    WScript.Quit
End If

strRequest = WScript.Arguments(0) + "," + WScript.Arguments(1) + ";"

strComputer = WScript.Arguments(2)

Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate," _
    &"authenticationLevel=pktPrivacy}!\\" _
    & strComputer & "\root\wmi")

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SetBiosSetting")
```


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```
For Each objItem in colItems
    ObjItem.SetBiosSetting strRequest, strReturn
Next

WScript.Echo strRequest
WScript.Echo " SetBiosSetting: " + strReturn

If strReturn <> "Success" Then
    WScript.Quit
End If

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SaveBiosSettings")

strReturn = "error"
For Each objItem in colItems
    ObjItem.SaveBiosSettings ";", strReturn
Next

WScript.Echo strRequest
WScript.Echo " SaveBiosSettings: " + strReturn
```

Set a single BIOS setting on a remote computer when a supervisor password exists

Use the sample scripts in the ZIP file as templates to set a single BIOS setting on a remote computer when a supervisor password exists.

Syntax: cscript.exe SetConfigPasswordRemote.vbs [Item] [Value] [Password + Encoding] [Hostname]
Example: cscript.exe SetConfigPasswordRemote.vbs WakeOnLAN Disable pass,ascii,us mattdev-c5

```
'
' Set specific BIOS Setting
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 4 Then
    WScript.Echo "SetConfigPasswordRemote.vbs [setting] [value]
 [password + encoding] [hostname]"
    WScript.Quit
End If

strRequest = WScript.Arguments(0) + "," + WScript.Arguments(1) + "," +
 WScript.Arguments(2) + ";"

strComputer = WScript.Arguments(3)

Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate," _
    &"authenticationLevel=pktPrivacy}!\\" _
    & strComputer & "\root\wmi")

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SetBiosSetting")

For Each objItem in colItems
    ObjItem.SetBiosSetting strRequest, strReturn
Next

WScript.Echo strRequest
WScript.Echo " SetBiosSetting: " + strReturn

If strReturn <> "Success" Then
```


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```
    WScript.Quit
End If

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SaveBiosSettings")

strReturn = "error"
For Each objItem in colItems
    ObjItem.SaveBiosSettings WScript.Arguments(2) + ";", strReturn
Next

WScript.Echo strRequest
WScript.Echo " SaveBiosSettings: " + strReturn
```

Set a supervisor password on the local computer when a supervisor password exists

Use the sample scripts in the ZIP file as templates to set a supervisor password on the local computer when a supervisor password exists.

Note: You cannot set a supervisor password if one does not already exist.

Syntax: `cscript.exe SetSupervisorPassword.vbs [Old Password] [New Password] [encoding]`
Example: `cscript.exe SetSupervisorPassword.vbs oldpass newpass ascii,us`

```
'
' Update Admnistrator Password
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 3 Then
    WScript.Echo "SetSupervisorPassword.vbs [old Password] [new Password]
[encoding]" WScript.Quit
End If

strRequest = "pap," + WScript.Arguments(0) + "," + WScript.Arguments(1) + "," +
 WScript.Arguments(2) + ";"

strComputer = "LOCALHOST"     ' Change as needed.
Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate}!\\" & strComputer & "\root\wmi")
Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SetBiosPassword")

strReturn = "error"
For Each objItem in colItems
    ObjItem.SetBiosPassword strRequest, strReturn
Next

WScript.Echo " SetBiosPassword: "+ strReturn
```

Set a supervisor password on a remote computer when a supervisor password exists

Use the sample scripts in the ZIP file as templates to set the supervisor password on a remote computer when a supervisor password exists.

Note: You cannot set a supervisor password if one does not already exist.

Syntax: `cscript.exe SetSupervisorPasswordRemote.vbs [Old Password] [New Password] [encoding] [Hostname]`

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Example: cscript.exe SetSupervisorPasswordRemote.vbs oldpass newpass ascii,us mattdev-c5

```
'
' Update Admnistrator Password
'
On Error Resume Next
Dim colItems

If WScript.Arguments.Count <> 4 Then
    WScript.Echo "SetSupervisorPasswordRemote.vbs [old Password]
 [new Password] [encoding] [hostname]"
    WScript.Quit
End If;
strRequest = "pap," + WScript.Arguments(0) + "," + WScript.Arguments(1)
+ "," + WScript.Arguments(2) + "*"

strComputer = WScript.Arguments(3)

Set objWMIService = GetObject("WinMgmts:" _
    &"{ImpersonationLevel=Impersonate," _
    &"authenticationLevel=pktPrivacy}!\\" _
    & strComputer & "\root\wmi")

Set colItems = objWMIService.ExecQuery("Select * from Lenovo_SetBiosPassword")

strReturn = "error"
For Each objItem in colItems
    ObjItem.SetBiosPassword strRequest, strReturn
Next

WScript.Echo " SetBiosPassword: "+ strReturn
```


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Appendix B. Sample PowerShell scripts for remote BIOS management

The following PowerShell scripts are examples that can be used with management servers.

Get all current BIOS settings

Use the following script as a template to display all current BIOS settings on the local computer.

```
<Command>
gwmi -class Lenovo_BiosSetting -namespace root\wmi | ForEach-Object
{if ($_.CurrentSetting -ne "") {Write-Host $_.CurrentSetting.replace(","," = ")}}
```

To obtain the current BIOS settings from a remote computer on your network, replace test-pc with the computer name of the target computer in the following command. You will be prompted to enter the userid and password of the administrator-level account for the remote computer.

```
<Command>
gwmi -class Lenovo_BiosSetting -namespace root\wmi -ComputerName test-pc
-credential
(get-credential) | ForEach-Object {if ($_.CurrentSetting -ne "")
{Write-Host $_.CurrentSetting.replace(","," = ")}}

<Sample output>
PS C:\> gwmi -class Lenovo_BiosSetting -namespace root\wmi -ComputerName test-pc
-credential (get-credential) | ForEach-Object {if ($_.CurrentSetting -ne "")
{Write-Host $_.CurrentSetting.replace(","," = ")}}

cmdlet get-credential at command pipeline position
1 Supply values for the following parameters:
Credential
WakeOnLAN = Enable
FlashOverLAN = Enable
EthernetLANOptionROM = Enable
HarddriveDMA = Enable
WirelessLANandWiMAXRadios = On
SerialPort = Disable
SerialPortIO = 3F8
SerialPortIRQ = 4
ParallelPort = Enable
ParallelPortMode = BiDirectional
ParallelPortIO = 3BC
ParallelPortIRQ = 7
ParallelPortDMA = 0
PCIINTA = 11
PCIINTB = 11
PCIINTC = 11
PCIINTD = 11
PCIINTE = 11
PCIINTF = 11
PCIINTG = 11
PCIINTH = 11
USBBIOSSupport = Enable
AlwaysOnUSB = Disable
TrackPoint = Automatic
TouchPad = Automatic
FnKeyLock = Disable
ThinkPadNumLock = Independent
```

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```
PowerOnNumLock = Auto
SpeedStep = Enable
SpeedStepModeAC = Automatic
SpeedStepModeBattery = BatteryOptimized
AdaptiveThermalManagementAC = MaximizePerformance
AdaptiveThermalManagementBattery = Balanced
CDROMSpeed = Normal
CPUPowerManagement = Automatic
PCIPowerManagement = Automatic
PowerControlBeep = Enable
LowBatteryAlarm = Enable
PasswordBeep = Disable
KeyboardBeep = Enable
ExtendedMemoryTest = Disable
SATAControllerMode = Compatibility
CoreMultiProcessing = Enable
VirtualizationTechnology = Disable
LegacyDevicesOnMiniDock = Enable
Passphrase = Enable
LockBIOSSetting = Disable
MinimumPasswordLength = Disable
BIOSPasswordAtUnattendedBoot = Enable
PasswordResetService = Enable
FingerprintPredesktopAuthentication = Enable
FingerprintReaderPriority = External
FingerprintSecurityMode = Normal
SecurityChip = Inactive
BIOSUpdateByEndUsers = Enable
DataExecutionPrevention = Enable
EthernetLANAccess = Enable
WirelessLANAccess = Enable
WiMAXAccess = Enable
WirelessWANAccess = Enable
BluetoothAccess = Enable
WirelessUSBAccess = Enable
ModemAccess = Enable
USBPortAccess = Enable
IEEE1394Access = Enable
SerialPortAccess = Enable
ParallelPortAccess = Enable
CardBusSlotAccess = Enable
ExpressCardAccess = Enable
PCIExpressSlotAccess = Enable
PrimaryVideo = Internal
BootDisplayDevice = LCD
TimerWakeWithBattery = Disable
UltrabayAccess = Enable
MemoryCardSlotAccess = Enable
SmartCardSlotAccess = Enable
IntegratedCameraAccess = Enable
MicrophoneAccess = Enable
BootMode = Quick
StartupOptionKeys = Enable
BootDeviceListF12Option = Enable
BootOrder = USBFDD:ATAPICD0:USBCD:HDD0:PCILAN:USBHDD:HDD
NetworkBootOrder = PCILAN:USBFDD:ATAPICD0:USBCD:HDD0:USBHDD:HDD1
PS C:\>
```

Show a particular BIOS setting

Use the sample scripts in the ZIP file as templates to display the current value of a specified setting. Replace "AlwaysOnUSB" with the name of the setting to be queried.

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```
<Command>
gwmi -class Lenovo_BiosSetting -namespace root\wmi | Where-Object
{$_.CurrentSetting.split(",",[StringSplitOptions]::RemoveEmptyEntries) -eq
"AlwaysOnUSB"}
| Format-List CurrentSetting
```

Remote computer:

```
<Command>
gwmi -class Lenovo_BiosSetting -namespace root\wmi -ComputerName test-pc -credential
(get-credential) | Where-Object {$_.CurrentSetting.split(",",[StringSplitOptions]
::RemoveEmptyEntries) -eq "AlwaysOnUSB"} | Format-List CurrentSetting

<Sample output>
PS C:\> gwmi -class Lenovo_BiosSetting -namespace root\wmi -ComputerName test-pc
-credential (get-credential) | Where-Object {$_.CurrentSetting.split(",",
[StringSplitOptions]::RemoveEmptyEntries) -eq "AlwaysOnUSB"}
| Format-List CurrentSetting

cmdlet get-credential at command pipeline position 1
Supply values for the following parameters:
Credential

CurrentSetting : AlwaysOnUSB,Disable
```

Setting a BIOS setting

Use the following script as a template to set the value of a setting. Replace "WakeOnLAN,Disable" with the item and value of your choice.

Note: The setting string is case sensitive and should be in the format "<item, <value>".

```
<Command>
(gwmi -class Lenovo_SetBiosSetting
-namespace root\wmi).SetBiosSetting ("WakeOnLAN,Disable")


__GENUS       : 2
__CLASS        : __PARAMETERS
__SUPERCLASS     :
__DYNASTY       : __PARAMETERS
__RELPATH      :
__PROPERTY_COUNT    : 1
__DERIVATION     : {}
__SERVER      :
__NAMESPACE     :
__PATH       :
return       : Success

PS C:\> (gwmi -class Lenovo_SaveBiosSettings -namespace root\wmi).
SaveBiosSettings

MemberType      : Method
OverloadDefinitions  : {System.Management.ManagementBaseObject
  SaveBiosSettings(System.String parameter)}
TypeNameOfValue    : System.Management.Automation.PSMethod
Value       : System.Management.ManagementBaseObject
 SaveBiosSettings(System.String parameter)
Name        : SaveBiosSettings
IsInstance      : True



PS C:\>
```


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